# COAL AGE

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## Payday at the Mine

By Berton Braley

*Written expressly for Coal Age*

I

Say Jimmie, git the whiskey out
An' order up the gin,
We want the boys to go the route
When they come rollin' in,
It's booze that starts 'em in to spend
An' gits 'em feelin' fine,
Till each guy's treatin' of his friend
—It's payday at the mine.

II

They stops fer just one little drink
To wash their throats of coal,
We'll keep 'em blowin' in their chink
Until we git their roll,
An' if it gits 'em wild an' rough
Or lyin' round like swine,
Aw, we don't care, we got the stuff
—It's payday at the mine.

III

If, full of booze, they row an' fight
An' bruise an' smash an' maim,
Aw well, we got our cash all right
An' they—they gits the blame,
It's they that has to go to jail
Or pay the court their fine,
An' we're the boys that gits the kale
—It's payday at the mine.

IV

They risks their lives an' sweats to make
Their little wad of pay,
But we're the wise ones—an' we take
The most of it away,
So let their women weep an' cry
An' let their children whine,
We're coinin' dough an' livin' high
—It's payday at the mine!

# Coal Mining in Carbon County, Utah

By A. C. Watts*

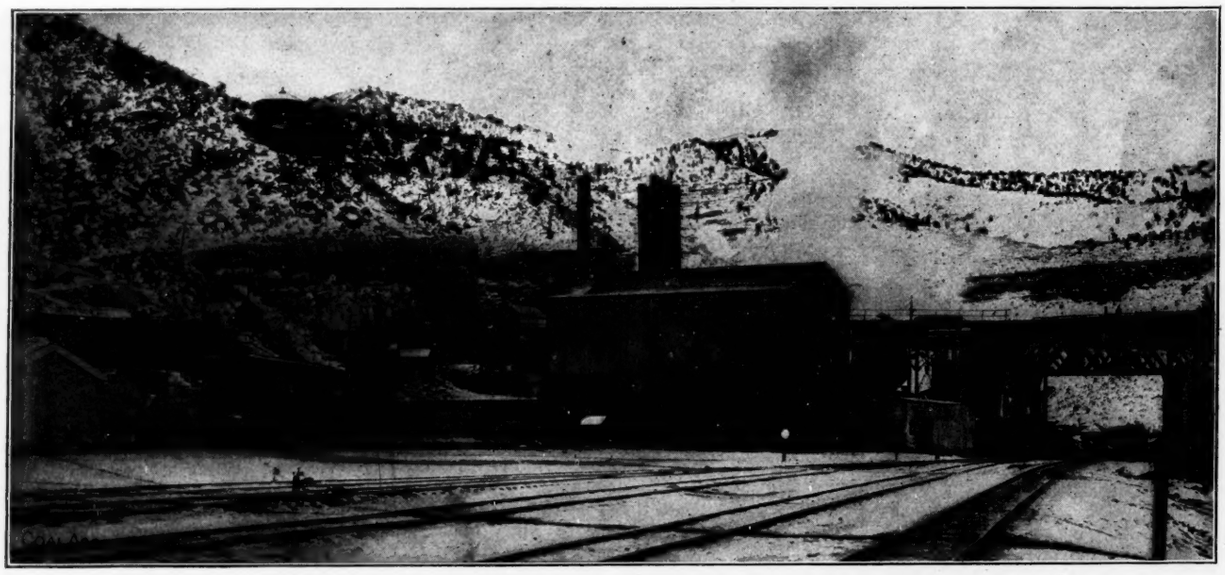
*SYNOPSIS—Description of one of the most important of the Western coal fields. Relatively thick seams prevail and mining conditions are generally favorable. The district is subject to those peculiar freaks, which have on occasions proved so disastrous, termed "bounces." Dikes and faults are encountered and the crop coal has been found burned for a distance of 1500 ft. from the surface.*

The advent of railroads in Utah marked the dawn of coal mining in this state. Soon after the completion of the Union Pacific R.R. in 1869, mines began to be opened, and in 1871 the Summit County R.R. began operations between Echo on the Union Pacific R.R. and the mines at Coalville, a distance of nine miles. In 1880 a line was in operation between the Coalville mines and the rich silver and lead mines at Park City, which required a cheaper fuel for their operations than the timber found on the mountains. In 1876 the Utah and Pleasant Valley R.R. commenced operations between the coal fields of Pleasant Valley at Scofield and the town of Springville.

This date probably marked the first coal mining on a commercial scale in Carbon County. In 1881 the Rio Grande Western Ry. began construction between Salt Lake City, Utah, and Grand Junction, Colo., connecting with the Denver & Rio Grande R.R. at the latter point. In 1889 the coal deposits at Castle Gate on the main line of the Rio Grande Western were opened and the second mine for commercial business in Carbon County came into being. This date has some significance not only in the history of coal mining in Utah, but in the United States as well, for it was at this mine, at about this date, that the dangers of coal dust were fully recognized and sprinkling by hose, the turning of exhaust steam into the mine, the use of electricity in the coal mines of the state and the practice of shooting from the outside of the mine with electricity, after all the men were out, were first introduced.

Although the coal measures of Utah embrace a wide territory and mining is being carried on in many places, by far the greater part of the coal produced, approximately 90 per cent., comes from Carbon County, so that a description of the methods employed by the companies operating there will cover the best practices in the state.

Carbon County lies approximately in the center of the state. The county seat, Price, a town of about 2000 inhabitants, is situated 121 miles east of Salt Lake City on the D. & R. G. R.R., and lies in the center of the agricultural district of the county. It is also an outfitting point for freighters to the Uintah Reservation.



Utah Fuel Co.s Steel Tipple and Screening Plant at Castle Gate

The principal drainage stream of this county is the Price River which heads in the Wasatch Mountains at Soldier Summit and also near the Scofield coal-mining district. The waters from this drainage area flow east in the Price River to the Green River, thence south in the Green to the Grand River, and south and southwest in the Grand to the Colorado, which empties into the Gulf of California.

Outside of the coal-mining towns of Castle Gate, Clear Creek, Winter Quarters, Sunnyside, Kenilworth, Black Hawk and Hiawatha, the principal towns of the county are Price, Helper (a D. & R. G. R.R. division point) Scofield and Wellington. The D. & R. G. R.R. is the only trunk line passing through this territory and Castle Gate is the only coal-mining town on the main line of the railroad. All other camps are reached by branch lines of the D. & R. G., or by railroads under the control of the mining companies.

The coal production of the county in 1912 was 2,750,265 short tons, an increase of 504,210 tons over 1911. Practically two-thirds of the total production of the state is consumed within its boundaries, the amount be-

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ing almost equal to the total output of Carbon County. The balance of the production goes to Idaho and the Northwest, Nevada and the Southwest, and to California.

The coal of the various seams is a good bituminous variety, and, although there are many grades having a coking tendency, none but that from Sunnyside field make a good coke. The coal as a rule is hard and clean and stands storage and shipment well. The analyses will vary generally between the two following:

| | | |
|---|---|---|
| Moisture | 3.49 | 1.87 |
| Volatile matter | 43.35 | 39.22 |
| Fixed carbon | 47.23 | 54.78 |
| Ash | 5.93 | 4.13 |
| | 100.00 | 100.00 |
| Sulphur | 0.67 | 1.022 |

A good ultimate analysis is about as follows:

| | |
|---|---|
| Hydrogen | 5.07 |
| Carbon | 79.06 |
| Nitrogen | 1.09 |
| Sulphur | 0.76 |
| Oxygen | 10.03 |
| Ash | 3.99 |
| Calories | 7720 |

GENERAL VIEW OF THE TOWN OF KENILWORTH IN CARBON COUNTY, UTAH

Average analysis of the coke is as follows:

| | |
|---|---|
| Moisture at 115° C. | 0.15 |
| Com. volatile matter | 1.05 |
| Fixed carbon | 88.61 |
| Ash | 10.19 |
| Total sulphur | 1.25 |

The roof and floor as a rule consist of hard, unyielding sandstones, although in some places there will be a few feet of shale on top of the coal. When two seams come to within a few feet of each other the parting is often a shale. The roof is generally so good that it is misleading and operators are sometimes led to trust too much to it. After extensive areas have been opened up, and the extraction of pillars begun, roof troubles often start and "bounces," which do much damage to pillars and are a serious menace to life, occur. The amount of cover over the coal varies, of course, a great deal; some mining is being done under 1500 to 2000 ft. of cover.

## GEOLOGY

The coal measures in Carbon County occur in the Laramie, or as some call it, the Mesa Verde formation of the Cretaceous period. There are three formations, locally known as the Upper, Main and Sub, coal horizons.

On top of the Upper horizon is a massive gray sandstone from 200 to 700 ft. thick, called the Castle Gate Reef. This forms the high vertical cliffs seen from the train in the Price Valley Cañon in the vicinity of Castle Gate, and near the bottom of the formation are some shale and thin coal seams.

*The Upper Coal Horizon* is from 200 to 500 ft. thick and consists of thin beds of sandstones and shales with thin seams of coal, occasionally 5 ft. thick, occurring locally. At present these seams have no commercial value.

*The Main Coal Horizon* is from 200 to 500 ft. thick and consists of alternating beds of sandstones and shales. The latter are often arenaceous and the sandstones, massive. In this horizon are all the workable coal seams at present known in this field with the exception of the Sub coal seam in Spring Cañon between Castle Gate and Helper. There are two, and sometimes three, workable seams varying in thickness from 5 to 20 ft. The Castle Gate seam is the most important one in the district, and, although it pinches out in places, it is generally between 5 and 18 ft. in thickness. This seam rests on what is known locally as the Castle Gate coal floor, a massive, grayish white sandstone from 60 to 80 ft. thick, which serves to identify the seam and the workable horizon.

*The Sub Coal Horizon* is from 100 to 160 ft. thick and lies directly under the Castle Gate coal floor. One seam of this horizon, though usually thin, occasionally attains a workable thickness as noted above. This seam rests on a sandstone floor of from 40 to 60 ft. in thickness which lies on the Montana Shales.

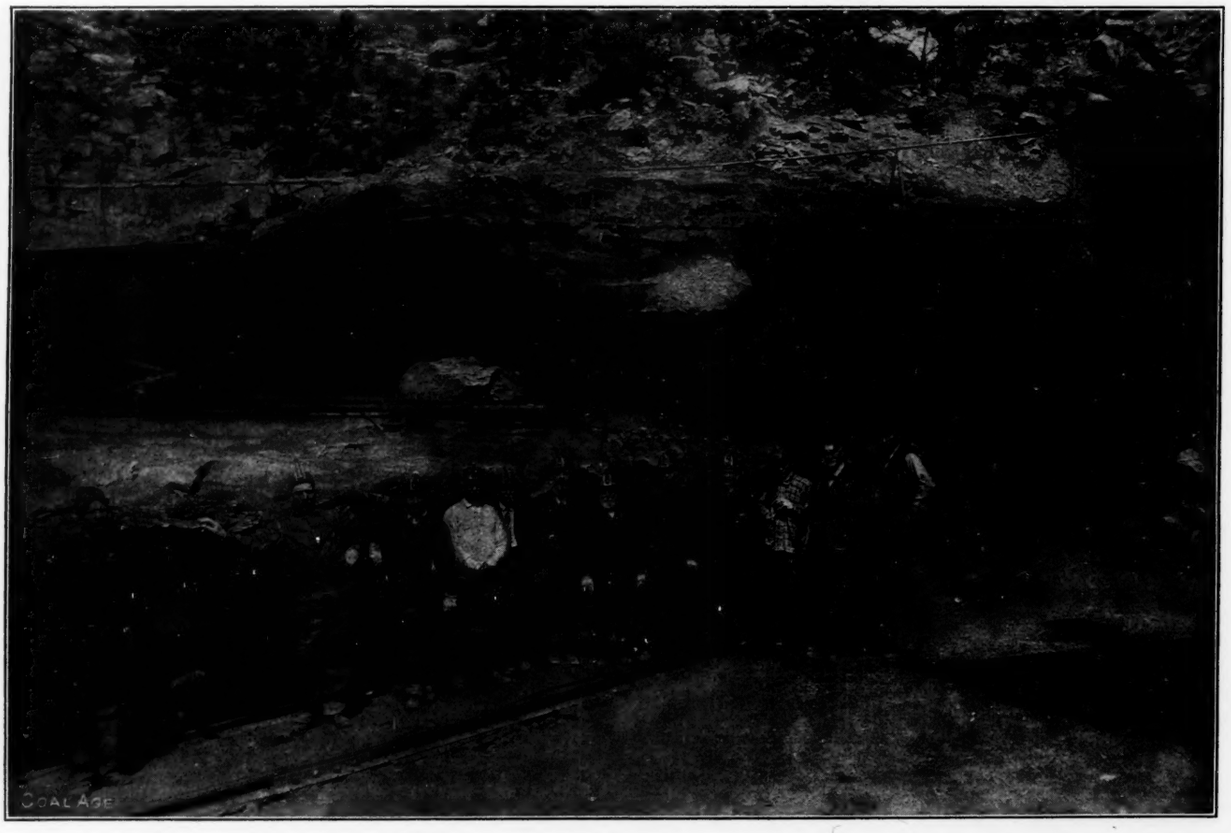
The pitch of the seams varies in different localities from practically level to 10 or 12 per cent., and the two extremes may be found within a few miles of each other. The Scofield district, or Pleasant Valley coal fields, is traversed with north and south faults having throws ranging from a few feet to 1500, and with many cross faults, which add considerably to the difficulties and ex-

pense of mining. Dikes are encountered as thick as 50 ft. The width of these dikes does not seem to have any influence on the amount of coking of the coal; the smallest dikes sometimes have the greatest amount of coked coal adjoining them. These dikes, as encountered in the mines, run approximately east and west.

From the Castle Gate district east, great areas of burnt coal are encountered. In many places the burning has penetrated a distance of 1500 ft. from the outcrop. It is usually the case that the upper seams have been burnt the most; the lower ones are often found to be good for a considerable distance under a burned area of the upper seams. This burning must have occurred many years ago, as evidenced by the growth of trees over some parts of the burnt area.

rock from weathering, minimizes the amount of timber required, and affords an easy way of recovering a large percentage of the coal.

Entries as a rule are driven on sights as well as rooms, as experience has shown that water-level entries make the maintenance of proper pillars for safe mining difficult because the seams are so irregular. The seams are so thick, as a rule, that the grading of entries is comparatively easy and inexpensive. The pillars between entries will vary between 30 and 60 ft. with barrier pillars between the rooms below of from 50 to 150 ft. Main slopes and haulageways have thick pillars, from 100 to 250 ft. on each side. The general heavy cover requires substantial pillars and careful work in drawing them. All mines thus far opened are slopes or drifts. The pos-




INSPECTION PARTY AT THE KENILWORTH MINE. NOTE THE GREAT THICKNESS OF THE SEAM

### SYSTEM OF MINING

The room-and-pillar system of mining is generally practiced. Rooms vary from 18 to 30 ft. wide, according to mining conditions. Where mining machines are used in low coal, the rooms are 30 ft. wide and have two tracks, one on each side. Pillars between are from 30 to 50 ft. thick, depending upon the nature of the coal, roof and floor and depth of cover. The length of rooms will average 350 ft. Those in pitching seams are turned off level entries at such angles as will permit them being worked on, or quartering to, the face cleavages of the coal and not have the grade too steep for animal haulage. In large seams, from 11 to 18 ft. thick, a roof of coal varying generally from 3 to 8 ft. is left up until retreating is started. This method gives additional safety to the miners, as the coal forms a good roof and protects the

sibilities of shaft mining are limited as the mountains are precipitous and high.

Undercutting the coal by hand is followed at many of the mines, and in some places where conditions demand, overcutting is practiced. The undercutting by chain-mining machines is being introduced and will probably be followed to a greater extent in the future. The continuous cutter, short-wall machine seems to be the best adapted to the work. In several mines shooting off the solid is still in vogue. Black powder is still used at some mines, but the use of permissible explosives is becoming more general.

### SHOTFIRING AND SPRINKLING

In some mines shotfiring is done by the miners, usually at stated periods during the day. Shotfirers or in-

spectors are employed, whose duty it is to continually inspect the preparation and firing of shots. Rigid inspection is the general practice, as the explosive nature of the coal dust has taught operators to be careful. At two of the mines of the Utah Fuel Co., Castle Gate and Sunnyside, shotfiring by electricity from the outside, after all men and animals are out of the mine, has been prac-

Surface Plant at the Hiawatha Mine

ticed with excellent results for years, and this is looked upon with favor by most people. This method of firing was adopted at Castle Gate about 1889, and as far as is known this was the first time this commendable safeguard was tried. It was the outgrowth of a series of experiments to reduce the number of dust explosions and was used in conjunction with sprinkling and exhaust steam. With electric shotfiring both dynamite and permissible explosives are used, with wet wood pulp or clay tamping.

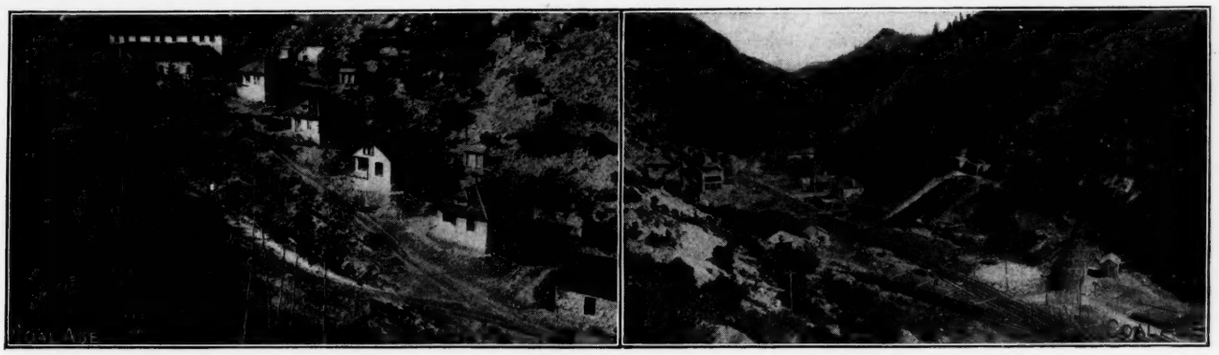
The state mine law requires all mines not naturally damp to be thoroughly wet down by some sprinkling device, although the moistening by turning in live or exhaust steam is recognized when shown to be efficient, and this method is used in many dry mines. Not only is the floor sprinkled, but the sides, roof, timbers, overcasts, brattices, doors and in fact all places in the open parts of the mines where dust can lodge. The dust must be so wet that it can be easily pressed into a ball by the hand. The mines are laid with pipe and the places sprinkled by hand through hose carried by regularly employed sprinklers.

Water is pumped into the mines in most cases, although in some mines the pumps are so connected as to be used in part for this purpose. Pipes are laid in the return airways when there is any danger from freezing in the cold weather. In the intakes where the water freezes, salt is used. While sprinkling has been compulsory since about 1900, it was adopted at the Castle Gate mine of the Utah Fuel Co. as early as 1889, and sprays, operated by steam in connection with the water, were placed at regular intervals along the main intake. That the system has proved its worth can be shown in many ways as, for instance: Samples of dust have been taken from abandoned places where there was no water, and which had not been sprinkled for four years, and have been found to contain 50 per cent. moisture, and were of about the consistency of mud. The objections that dust cannot be successfully moistened; that moisture injuriously affects the roof and the health of the men; that it forms wet places which seriously inconvenience the men, have been proved not to apply in this region.

### Gases and Methods of Ventilating

Explosive gas is found in some mines, although in but one is it in sufficient quantities to make the use of safety lamps imperative. These are, however, used in other mines in the pillar workings where bounces sometimes occur. This is found to be necessary, because the dust generated by the bounces crushing the pillars, can be readily fired by open lights.

Ventilation is accomplished entirely by mechanical means and there are various types of fans. The older installations were large, slow-speed fans, but of late the adoption of the smaller, high-speed type is coming more into vogue. Most of the fans are situated near the power houses so that steam is used to run them, but when the workings are at some distance, electricity is used. Almost all fans are run exhausting and are equipped with reversing doors; they are generally so located that they have not been destroyed by the explosions in the past. Some booster fans of the Stine variety are used and have given excellent results. The split system of ventilation is used almost entirely, the state law requiring that not more than 75 persons shall work at the same time in one split.



Consolidated Fuel Co.'s Upper Camp and the Hiawatha Mine Opening

The law also requires 100 cu.ft. of air per min. for each person and 300 cu.ft. for each animal. Stoppings and overcasts of concrete are becoming more popular.

### Haulage and Hoisting

As a general rule all gathering from rooms to partings is done by animals, heavy horses being used a great deal. In pitching seams the coal is taken to partings in level entries and either let down or raised to the main haulage-roads where locomotives take it to the tipple. Few steam

hoists are used, electricity being the general practice. At some mines it is necessary to have long outside rope tramways to lower the coal to the tipples.

Cars are generally made of wood with a capacity of from one to three tons and track gages from 36 to 42 in. Gathering locomotives are used in some mines where the coal seams are flat. Main haulage locomotives vary in weight from 6 to 15 tons. Sixteen-pound rails are used in rooms and from 30 to 60 lb. for main haulage roads.

All mines have their own steam-power plants using run-of-mine, slack and sometimes dust under the boilers. The majority of boilers used are the horizontal, return-tubular type of from 125 to 150 hp., although there are some internal furnace boilers used, having steam pressures of between 100 and 150 lb. At some mines American Automatic stokers are used. Of late there is a tendency toward central power plants for mines of the same company, situated within a few miles of each other.

Almost every mine is using electricity for hoisting, haulage and lighting. Reciprocating engines, direct connected to the generators, have been the usual installations up to the last year when turbo-generators appeared in the field. Direct current, of voltage varying from 250 to 500 is used in the mines, while alternating current of from 2200 to 4000 volts is used for transmission lines outside the mines. This is converted to direct current by motor-generator sets at the mines.

### Preparation of Coal

All mines where commercial coal is mined are equipped with shaking-screen plants, making four principal sizes, as follows:

Lump over 4½ in. round perforations
Nut through 4½ in. and over 1¼ in. round
Slack through 1¼ in. and over ¾ in. round
Dust through ¾ in. round.

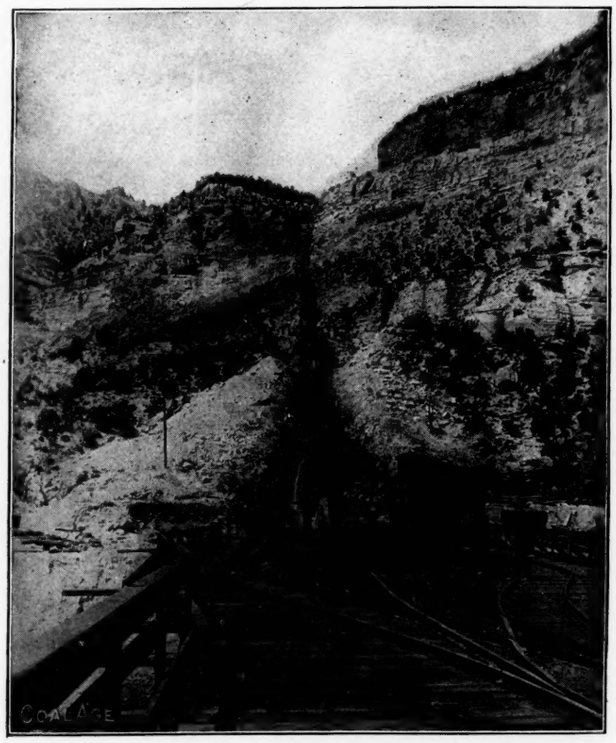
These sizes will vary a little, owing to the nature of the coal, as some break into more angular and slabby shapes than others. At mines where the coal is wet, rescreening of the smaller sizes, by means of revolving screens, is resorted to. At the Winter Quarters mine of the Utah Fuel Co., in the Pleasant Valley district, the first steel tipple and screening plant was built in the winter of 1909-10. At the Castle Gate mine of the same company the second steel tipple and screening plant was built in the summer of 1912, while the third installation of this kind is being erected by the Spring Cañon Coal Co.

The general practice is to dump the coal by Phillips or Wilson cross-over, or rotary dumps, after having been weighed with registering scales, into receiving hoppers, from which it is fed to the shakers by reciprocating feeders. As the seams mined are, as a general rule, clean throughout, picking is not resorted to, to any extent, and washing is unnecessary. Picking can be done at some plants which use conveyors for carrying the coal from the receiving hoppers to the screens. The boxcar loaders, used for loading run-of-mine, lump and nut into boxcars, are the Ottumwa and Christy types.

### Railroad Yards

Railroad yards at the mines are laid out to suit conditions and no general plan is or could be adopted. At some plants there are tracks for each grade of coal, with scales under the tipple on each track. At others, one track may be used to serve for two and sometimes three different sizes of coal. Another plan is to have but one track scale, with deal rails, on which all cars, empties and loads are weighed with a locomotive. At the Castle Gate mine of the Utah Fuel Co., two railroad track-scales are used, one above the tipple for weighing empties and one below for the loads. As all the mines are located in mountain cañons, the grades of the yards must conform in most cases to those of the cañons and as high as 4 per cent. is found.

The only coking is done by the Utah Fuel Co. at its Sunnyside mine, where it has 650 beehive ovens. The production of coke in 1912 was 347,356 tons, an increase of 134,988 tons over 1911. The coal for coking is crushed to pass through a ⅜-in. square opening.




Tipple and Incline at the Kenilworth Operation

### Nationalties Represented and Sociological Conditions

Of a total of 4063 men employed at the mines Americans comprise 35 per cent., Greeks 30, Italians 16, Austrians 11, Japanese 3 and Negroes, French, Scandinavians, Swedes and Germans make up the balance, or 5 per cent. During 1912 the larger producers averaged 280 working days and the average tonnage per man was 770.

As most of the mines are situated in mountain cañons, the laying out of towns in a regular manner is a difficult proposition, and as water is a rather expensive luxury, the possibilities of having attractive homes with lawns and gardens are limited. The altitude of some of the camps adds to the difficulties of garden making, and none but the hardiest and quick growing variety of flowers can be raised in these places where heavy frosts often occur in midsummer.

Mines are equipped with Draeger helmets, and have regularly trained men ready for emergencies. The motto, "Safety is the First Consideration," is evidenced by the methods adopted at all mines.

# A Storage Battery Gathering Motor

Special Correspondence

*SYNOPSIS—One of the latest application of the storage-battery electric-haulage locomotive is for gathering work in coal mines. One of these machines, manufactured by the General Electric Co., was recently installed in the Glendower colliery of the Philadelphia & Reading Coal & Iron Co. The locomotive is designed specially for the service and built for hauling six cars.*

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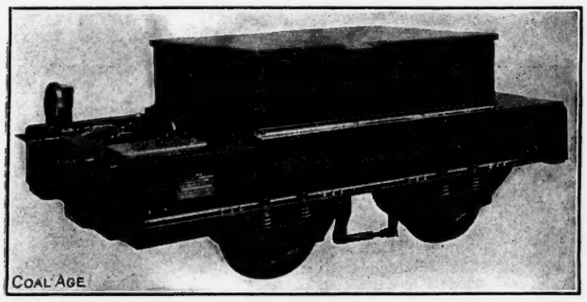
Electric locomotives, of both the storage battery and overhead-trolley types, have been employed advantageously for industrial service. Comparatively recently a number of motors of this type were also introduced and have operated successfully in the work of excavating the




Motor Assembled Ready for Work

Catskill Aqueduct Tunnel in New York. In general, locomotives of this kind are designed specifically for short-distance hauls, at moderate speeds, where it is not feasible to install the overhead-trolley system. Under these conditions, the storage-battery machine has proved to be both economical and well adapted for the purpose.

## Description of the Motor

The locomotive for service in the Glendower colliery is equipped with two, 85-volt motors and controller. The batteries are Type A-8, Edison, 70-cell and have a 300-ampere-hour capacity with a discharge rate of 60 amperes for five hours. They provide, at the full rated drawbar pull and speed, for a mileage of nine miles with one charge of the batteries. Under an assumed car and track friction of 30 lb. per ton on level track, this rating is equivalent to 300 ton-miles on one charge. The machine is fitted with the usual ampere-hour meter, indicating the amount of charge and discharge, headlight and gong.

The locomotive is built to conform to the following specifications:

| | |
|---|---|
| Total weight | 8000 lb. |
| Length overall | 8-ft. 9-in. |
| Width overall | 5-ft. 3-in. |
| Height over platform | 4-ft. 4-in. |
| Height over battery compartment | 3-ft. 9-in. |
| Wheel base | 4½-in. |
| Diameter wheels | 20-in. |
| Track gage | 44-in. |
| Rated drawbar pull | 1000-lb. |
| Speed at rated drawbar pull | 3¼ m.p.hr. |

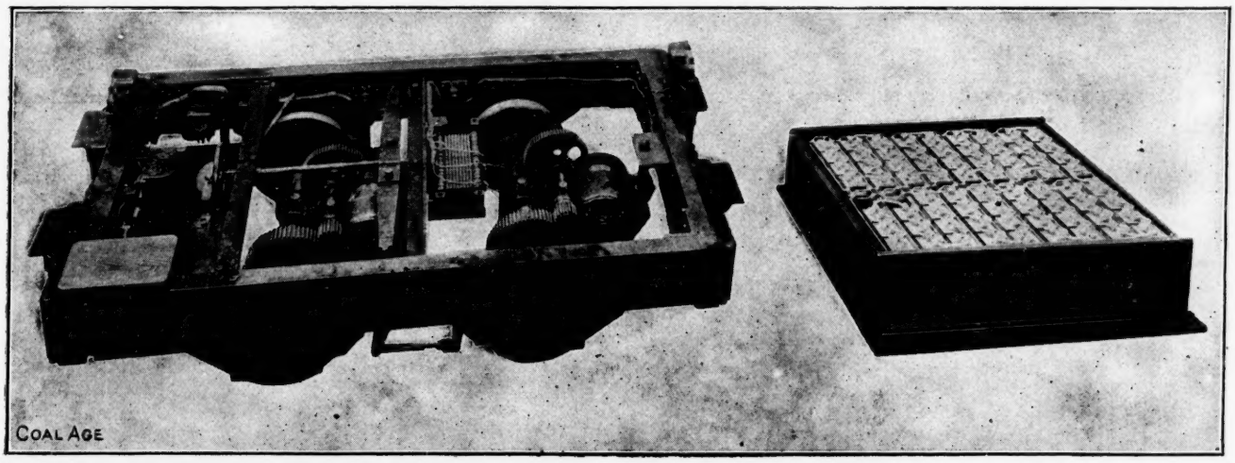
The batteries are designed for the particular service, and are of rugged construction; the plates are made specially to give the high service efficiency. The cells are grouped in 18 trays and are mounted on top the locomotive frame in a wooden case.

The mechanical design of the machine is in accordance with the latest modern practice. The frame consists of steel channel sides and steel plate ends carefully fitted at the joints and held together rigidly by bolts and steel angles. The end plates are faced with wooden bumpers, to which suitable couplers are attached. A seat for the operator is provided in the rear. The cast-steel pedestal jaws, which carry the journal boxes, are securely bolted to the lower web of the channel side-frames.

## Details of Construction

The cast-steel journal boxes are of special design and fitted with roller bearings, which assures efficient mechanical transmission of power and consequent economy in battery current consumption. The weight of the car is supported from the journal boxes by two coiled springs. The wheels are of chilled iron, and are pressed on and securely keyed to the axles, which are made from a special grade of steel, case-hardened at the journals. Thus the wear on either the roller bearings or the axles is practically negligible.

Brake tension is effected by means of a square, threaded, brake-spindle. A square-threaded nut travels




View of Motor Truck with Battery Removed and Showing Driving Mechanism

on the spindle and carries an equalizing bar, to the ends of which are connected chains leading from the brake levers. This device admits of locking the brakes automatically, without the use of pawls or ratchets, in any position left by the operator. The controller is of the drum type and built for this particular class of work.

The motors are series wound, totally inclosed and of the familiar automobile type. They are designed especially to operate from batteries and have characteristics that develop the maximum possible economy in the use of battery current. They have high efficiency, large overload capacity and operate with practically sparkless commutation. The high efficiency is obtained by designing them with a small air-gap and running the iron at low densities. By reason of the latter provision, the speed and torque characteristics are steeper than in the ordinary series motor, thereby tending to limit the overload which can be thrown on the batteries.

The motors drive the axles through double reduction gearing, an intermediate shaft, supported in the bearing housing integral with the suspension cradle, carrying the intermediate gearing. As slow-speed service is ordinarily required of a storage-battery locomotive, the use of double reduction gearing affords such speeds with minimum rheostatic losses; and due to the large gear ratio from armature shaft to wheel tread, high tractive efforts are obtained at comparatively small current inputs to the motors.

## Stripping Operations, at Pittsburg, Kansas

All the steam shovels used in the coal stripping operations in the Pittsburg district are working continually, and four new ones are being erected. It is expected that by the end of February there will be 20 in active operation. A noteworthy fact is that all have been installed within the past two years, thus demonstrating the greater advantage and economy in strip mining as compared with underground shaft mining. The coal in this field averages 3 ft. in thickness, or 3000 tons to the acre, and it is claimed that a depth of 10 to 30 ft. of overburden can be removed with the new type of revolving steam shovel, at a low cost per ton of coal mined.

There are many thousand acres of good coal land available for stripping, with an overburden varying from 10 ft. to 25 ft. in depth. This land can be bought or leased and operated at a good profit; in fact, the Kansas coal fields offer as great inducements for stripping as any other section of the country. The coal is of a good quality and is quite free from sulphur. It burns freely, with but little clinker.

The increased demand for soft coal is largely due to the withdrawal of crude oil from the market and the failure of the natural-gas supply.

Two large 175-ton Bucyrus shovels have been erected for Smith, Scott & White, contractors on the Weir fields, two miles east of Chicaope, and a third is being installed. The Pittsburg-Scammon Coal Co. is also using a Bucyrus shovel of 150-tons capacity, on their field two miles south of Scammon.

The E. H. Markham Coal Co. is operating a 150-ton Bucyrus steam shovel of the revolving type, which is capable of handling 2000 cu.yd. of overburden and soft shale a day. The Markham Co.'s Workings are located at Curranville, about 10 miles north of Pittsburg. The coal in this locality is of good quality, about 3 ft. thick, and the overburden varies from 15 to 22 ft. in depth.

Another 150-ton Bucyrus shovel has been purchased by the Roy Millner Coal Co., of Weir City, and is now being installed. This shovel carries a 60-ft. boom, 2½-yd. dipper, and will handle 2000 cu.yd. of earth per 10-hr. day.

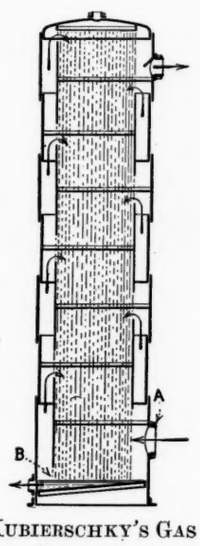
A Marion steam shovel, model 270, has been installed at the Ellsworth-Klaner Co., two miles east of Chicaope. This shovel is likewise of the revolving type, with a 90-ft. boom, a 5-yd. dipper, and will handle 2000 cu.yd. a day. This long boom enables a 40-ft. depth of overburden to be removed.

The Sternberg Construction Co., who have been stripping coal with a Marion steam shovel, model 250, have recently sold their plant three miles north of Weir City, to the J. R. Crowe Coal Co. They have purchased a tract of 400 acres near Minden, Mo., and will proceed to develop it at once.

## Kubierschky's Gas Cooler and Washer

By Alfred Gobiet*

A frequent fault of coolers and washers, such as are used for coke-oven gas, results from the unequal temperatures of the different strata of the gases. As they enter at the bottom they are cooled and tend to remain there while the hot gases following them, which lack the velocity needed to sweep them up and overcome the resistance of the falling water, seek short cuts of less resistance to the upper regions. Moreover, gases that have been washed and cooled will sink to the bottom. Thus the efficiency of the apparatus is seriously affected.



Kubierschky's Gas Cooler and Washer

To obviate this difficulty, Dr. Kubierschky has patented the washer shown herewith.

It is divided into vertical compartments, with sieve bottoms which let the water drip through in a fine rain from one to another, but are so clogged by the liquid that they obstruct currents of gas from passing through. The gas enters *A* and as it is cooled, sinks. The light gas following it floats over it like oil upon water, during which time it is well exposed to the streams.

As it cools, it presses downward and crowds the lower layer through the outlet *B* into the compartment next above, where the same process is repeated. Finally the heaviest, coolest and best washed gas escapes from the top chamber. The gases have no liquid resistance to overcome in ascending, and the water flow harmonizes with that of the gas instead of opposing it. This device is said to effect a perfect washing and cooling.

Note—Abstract of paper appearing in "Montanische Rundschau" (Vienna), Oct. 1, 1912.

*Engineer, the Witkowitzer Mines Ostrau, Moravia, Austria.

# CURRENT COAL LITERATURE

## A British Byproduct Coking Plant

Until quite recently the beehive coke oven held undisputed sway in Cumberland, England. Indeed, to go no further back than 1910, out of the total of 582 ovens which were then in operation, no less than 502 were of the beehive and square types, the remaining 80 being Koppers regenerative byproduct ovens installed at Watergate Colliery, at Flimby and at St. Helens No. 3 mine, at Siddick. Naturally other coke makers in the district paid close attention to the operation of these new ovens, which proved from the first a marked success, perhaps the best testimony to this being that the whole of the

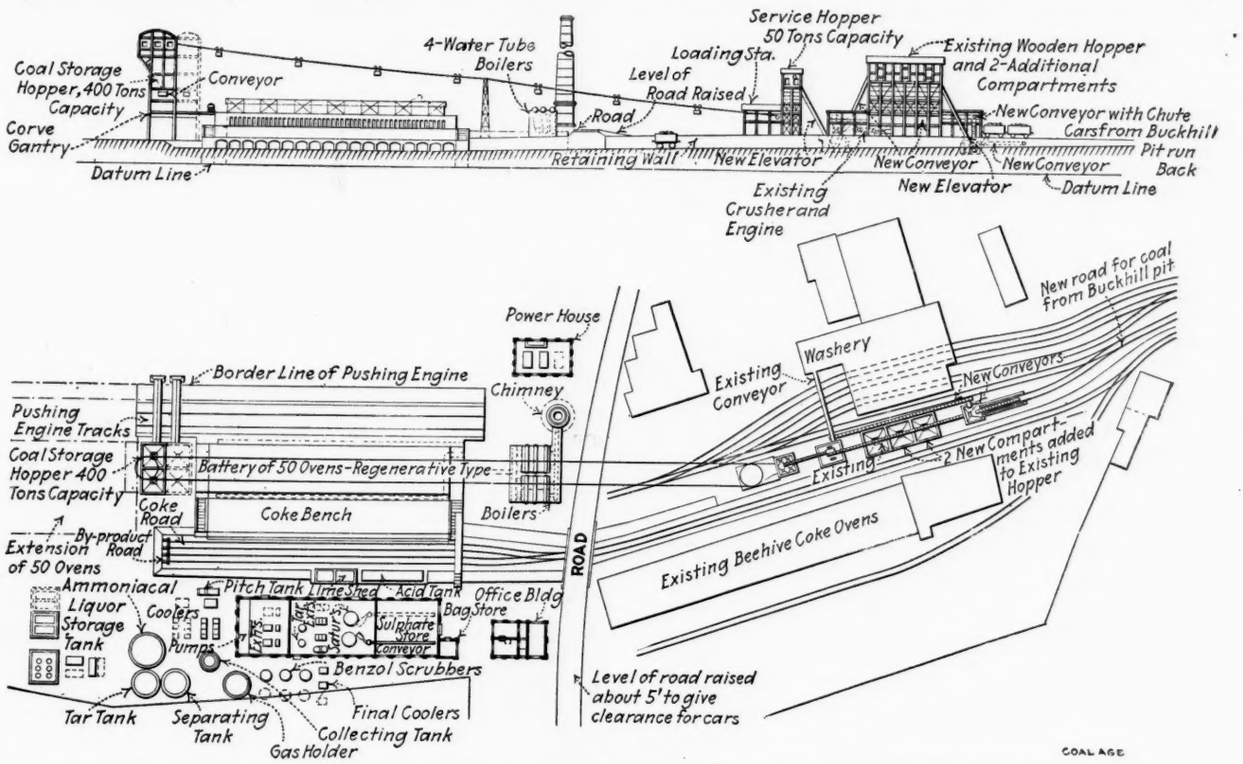



FIG. 1. GENERAL PLAN AND ELEVATION OF BYPRODUCT PLANT AT THE CLIFTON COLLIERY

byproduct ovens in Cumberland, both in operation and under construction, are of the same type.

Though the introduction of the regenerative oven into Cumberland was somewhat belated, its development has since been rapid, for while in 1910 there were only 80 such ovens installed, there are today 230 in regular service, and a further 100 in course of construction. These last comprise an additional 10 to the existing battery of 50 for the Moresby Coal Co., Ltd., a battery of 50 for the Harrington Coke Ovens, Ltd., and an initial installation of 40 ovens for the Oughterside Coal Co., Limited.

Prior to starting the plant with which this article deals, the Allerdale Coal Co., Ltd., was making coke in beehive ovens at both their Buckhill and Clifton collieries. A few of these are still in operation at Buckhill, where the waste heat is used for raising steam for the colliery. The plant installed at the Clifton collieries—with a capacity of 7000 tons of coke per month—is designed to deal with the smalls from the whole of the company's properties. Of the coal required at the ovens, the Clifton colliery supplies about a half and Buckhill and Brayton collieries each about a quarter, only a little outside coal being bought. The coal from Buckhill is delivered in a washed condition, while that from Brayton Knowe is washed, together with the Clifton smalls, in a Shepard washery, adjacent to which is the drainage bunker, which serves the disintegrator.

The new installation comprises a battery of 50 Koppers latest regenerative coke ovens, with recovery plant designed on the makers' patent direct-recovery principle for the extraction of tar and benzol. Provision is also made for the manufacture of sulphate of ammonia, together with auxiliary plant, comprising machinery for elevating and conveying the washed coal to the drainage bunker of 300 tons capacity, an aërial ropeway with a feed hopper of 560 tons capacity, and a combined coal-compressing and coke-discharging machine. In addition, four Stirling boilers and an electric generating plant for power and lighting are erected. The contract for

Note—From "Iron and Coal Trade Review," London, England, Jan. 17, 1913.

the whole of the work was placed with the Koppers' Coke Oven & Byproduct Co., Sheffield.

The general arrangement of the plant will be seen in our illustration, Fig. 1. The whole of the washed coal is delivered to the drainage bunker, that from Buckhill colliery, which is delivered washed, being raised by a bucket elevator, and the locally washed coal, treated in the Sheppard washery, delivered by conveyor. The coal is allowed to drain until the moisture does not exceed 8 per cent. From the drainage bunker the coal passes to the disintegrator, which at present is driven by a high-speed engine. This, however, will shortly give place to a Siemens motor of 100 hp. From the disintegrator the crushed coal is elevated to a 50-ton feed hopper, which serves an aërial ropeway of the Pohlig type, in connection with which an Avery automatic weigher and totalizer will shortly be installed. The ropeway buckets have a holding capacity of 9½ cwts., and are automatically discharged into the crushed-coal storage hopper at the ovens, which has a capacity of 560 tons. The ropeway is equal to handling 800 tons of coal in 12 hours.

From the storage bunker the coal is discharged through openings in the bottom onto a conveyor and thence into the receiving hoppers fitted to a combined coal-compressing and coke-discharging machine. The hoppers on this machine have a capacity equal to two full charges, thus enabling two ovens to be charged for each visit of the machine to the coal bunker. The stamps for compressing the charge are driven by a Brush motor of 8-10 hp. The combined ram and charger, which travels upon a double set of rails, is operated from a 50-hp. motor taking current from bare overhead wires. Any coal which may be split during charging operations is tipped down a chute at the end of the battery nearest the storage bunker, to which it is raised by means of a bucket elevator.

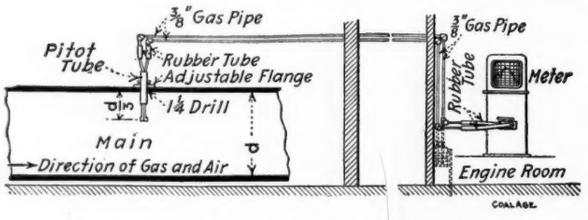



FIG. 2. THE "FACTUM" GAS AND AIR METER

## THE KOPPERS OVENS

Most of our readers will, no doubt, be familiar with the general principles of the Koppers ovens, in which the gas and air for combustion are separately distributed on each side and along the whole length of the oven. Each oven wall is formed of about 30 vertical flues with a gas jet in each, so that the ovens are heated from 60 points. The means of regulation are simple and effective, and absolutely uniform heating from end to end is rendered easily possible. This uniformity is, of course, the salient point of success in a coking plant, as not only is it essential to the production of a homogeneous coke and enables the charge to be burnt off more quickly, but it effects a considerable economy in gas, thus giving a larger available surplus.

The ovens, as previously stated, are of the regenerative type, the advantages claimed over those of the waste-heat type being important, though that does not seem to be so fully appreciated in England as upon the Continent and in America. It may not, therefore, be out of place to point out that the chief advantage to be derived from regenerative ovens is that the surplus heat in the coal (i.e., the heat over and above that which is required for heating the ovens) is produced wholly in the form of a combustible gas, while the surplus heat from waste-heat ovens is produced mainly in the form of a hot waste gas, which can only be used for firing boilers and must be consumed on the spot directly it is produced. Gas in a combustible form, such as is obtainable from regenerative ovens, on the other hand, can be employed for illuminating purposes, for raising power in gas engines, or for firing steam boilers. This last is, of course, by no means an economical application, as the gas engine would probably yield from two and one-half to three times the power produced from the steam raised with an equal quantity of gas.

The distinctive feature of the Koppers regenerative oven lies in the employment of separate regenerative chambers for each oven, so that each is an independent unit; thus the air for combustion and the chimney draft can be separately regulated. The average charge for each oven is 9½ tons of wet coal. The coke is discharged through a quencher onto a sloping bench, covered with cast-iron plates, from which it is loaded by gripes into the trucks, the coke being of exceptionally good quality and homogeneous character and little breeze being made.

As already stated, the byproduct recovery is on the direct-recovery system, or what is perhaps better known as Koppers low-temperature principle. The hot gases from the ovens pass by way of a common main to a series of multitubular water coolers, where the temperature is reduced and the condensation of tar and aqueous vapor brought about. The gas is then drawn by a turbo-blower, and driven forward to the tar extractors, where the last remaining traces of the tar are effectually removed, an operation which cannot be successfully performed without cooling the gases.

The turbo-blowers referred to (which, like all the important apparatus and engines in the plant, are in duplicate) work at 25-in. water gage. Their normal speed is 3400 r.p.m., but this is governed by the pressure in the main. The governor is a simple and ingenious arrangement which can best be described as a miniature gasometer, the top of whose gas tank is connected by levers to the stop valve of the turbine. After being freed from the tar the gas is superheated to such a degree that it may be passed directly into the saturator without condensation taking place. The salt produced is of excellent quality, being white in color and containing no trace of tar.

The sulphate factory adjoins the exhauster and pump house. The exhaust steam from the blowers provides the necessary heat for the superheaters, and the surplus exhaust, together with the exhaust steam from the pumps, is used for distilling the gas liquor without the addition of live steam. The benzol plant is arranged in a parallel line with the sulphate factory. After passing through the saturators, the gases are conducted to final coolers, where the temperature is reduced to the degree required for the efficient extraction of the benzol, which is washed out in the usual manner. From the scrubbers the gases pass in part back to the ovens and in part to the boilers, while a considerable portion is at present going to waste.

As a matter of fact, of the total gas evolved from the coal, approximately 70 per cent. is available for purposes other than heating the ovens.

### The Benzol Recovery

The Koppers method of benzol recovery is as follows: The rich oil containing the benzol is run into a collecting tank, where its temperature is about 20 deg. C., whence it is pumped into a preliminary heater, where the temperature is raised to about 40 deg. C. It then goes to the superheater and finally to the still proper, where it is subjected to distillation by means of live steam at a temperature of about 105 deg. C.

In this way the whole of the benzol is removed from the washing oil, and the benzol vapor, together with the steam, passes away into coolers, where the two liquids separate, owing to the difference in their densities, the washing oil, from which the benzol has been removed, passing out at the bottom of the still, through a series of water coolers, into the storage tanks to be used again. Water for condensing the gases is drawn from the River Derwent, which is distant about a quarter of a mile and is 145 ft. below the works' level. For this purpose Worthington centrifugal pumps are installed in duplicate. Each pump is driven direct by a 62-hp. motor, and is capable of delivering 822 gal. per minute.

The power-house equipment comprises two Browett-Lindley combined sets, each of 120 kw., generating three-phase current at 500 volts, and a small lighting set, consisting of a Robey high-speed engine coupled to a continuous-current dynamo generating at 230 volts.

Steam is raised in four Stirling boilers at 150 lb., fired entirely by waste gases. The power units exhaust to a Wright feed-water heater. In addition to firing these boilers, three of the Lancashire boilers at the colliery have a gas-burner fitted to each of the flues.

As previously stated, the results obtained at the Clifton colliery plant are of a remarkable character. We are indebted to the coke-works manager for the following figures, indicating the yield of the various products, as also for diagrams showing the gas yield and consumption.

Records of the gases are taken on a "Factum" meter (Fig. 9), which is installed in the manager's office. One reads: Coke, 72.5 per cent. of coal carbonized; tar, 5.25 per cent. of coal carbonized; sulphate of ammonia, 1.62 per cent. of coal carbonized; crude benzol, 3 gal. per ton of coal carbonized; surplus gas, 60 per cent. of total quantity evolved from coal. The surplus gas would certainly appear to be an abnormally high percentage; but the manager is satisfied as to its accuracy.

## Requirements of British Electrical Rules

In the course of his presidential address to the British Association of Mining Electrical Engineers, at Sheffield, on Sept. 21, 1912, W. C. Mountain referred to the new Home Office rules for the installation of electricity in Mines. Claiming an intimate knowledge of what the rules demand, he briefly stated the requirements as follows:

### Armoring Compulsory, Voltage Unspecified

1. All cables in future must be armored, the conductivity of the armoring being 50 per cent. of that of the cables inclosed if three-core, and if single armored cables are used for continuous current, then the armoring must be 25 per cent. of the conductivity of the cable inclosed and this armoring must be bonded every 50 feet.

2. No restriction is placed upon the voltages used underground (within, of course, reasonable limits), except that motors below 20 hp. must not be supplied at a pressure higher than 650 volts.

### Leakage Detectors and Grounding Required

3. Leakage detectors are required, and all systems must be grounded to the surface, preferably through the armoring or the outer sheath.

4. Direct-current electric lighting circuits which exceed 250 volts must be grounded. Similar alternating-current circuits must be grounded if the pressure exceeds 125 volts.

5. The method of grounding portable machinery, such as coal cutters and conveyors is described in the memorandum and the grounding arrangements must be such that the earth connection is made before the live connection. The live circuit must also be broken before the earth connection.

In brief, the main object of the new rules is to make armoring compulsory in the future; and there is no question but that armoring affords a good mechanical protection and is also convenient for grounding. Grounding may seem to be a simple matter but it is sometimes difficult to secure satisfactory results.

In a recent case, although the installation complied in all details with the new requirements, it was found that the resistance measured from the earthplate on the surface to the armor at the inby terminal was nearly 12 ohms, which is much more than it should be.

### The Difficulty in Grounding

Insulating strata exist in many mines. It is extremely difficult to bond the armoring to the junction boxes, and there is also the risk of the armoring being damaged, or the joints broken by falls and by corrosion. Therefore it is questionable whether a grounding system consisting of as many earthplates as possible is safer underground than an installation where grounding is avoided.

In every case it is necessary to consider the local circumstances, and only those experienced in this particular work can satisfactorily determine the right method of obtaining a good grounding system. There can be no question but that grounding in some form or another is desirable and in fact necessary.

## Our Front Cover This Week

The illustration on the front cover of this week's issue shows the 350-ft. Link-Belt chain-retarding conveyor and tipple, designed and built for the E. E. White Coal Co., Stotesbury, W. Va., by the Link-Belt Co. of Philadelphia. The capacity of this equipment is 300 tons per hour over two dumps. A 60-in. wide Link-Belt picking table in the head house delivers the coal to the retarder. The storage bin is shown at the bottom of the incline. This is one of the most modern and efficient tipple equipments in the West Virginia field.

# Some Notes on Diamond Drill Prospecting

By J. B. Dilworth*

*SYNOPSIS—An interesting review of the current practice in prospecting large undeveloped coal fields with the diamond drill. A number of useful hints are given with regard to the location of the holes, subterfuges of unscrupulous contractors and size of holes. The author regards $1.75 per foot as an average price for work of this character, although this cost often amounts to $2 or $2.50 in some districts. The article is confined more particularly to the drilling of relatively shallow and horizontal seams.*

The following article treats of the method of laying out a field for drilling; the character of drill employed; the form of contract; the supervision of drilling; the instrumental location of holes and the compilation of data obtained, which have proved most satisfactory in testing extensive areas of shaft coal in the Appalachian and Interior coal fields. With the rapid exhaustion of the more accessible areas of crop coal in the older bituminous fields within recent years, the attention of operators and capitalists has naturally been drawn to those localities where coal seams, known to be of commercial thickness and quality in neighboring fields, are buried beneath a few hundred feet of rock measures.

The seams are frequently as thick and pure in those areas as elsewhere and, when operated on a large scale, can be mined almost as cheaply as in drift or slope mining. The chief obstacle to their earlier development has been the difficulty of obtaining accurate information concerning the structure, bed section and quality of the seams, conditions which can be disclosed most satisfactorily by judicious prospecting with the diamond drill.

## Preliminary Examination

The engineer's first duty upon undertaking the prospecting of such a field is to familiarize himself with general geologic conditions in adjoining areas. There the seams, to be sought by the drills in the locality under consideration, will frequently be found to outcrop, and valuable data as to the structure of the region, its geologic section and the characteristics of the principal coal beds can be secured, which will prove a great help in interpreting the drill records obtained.

In determining the number of holes to be drilled, consideration must be given first, to the object of the drilling, whether a knowledge merely of the general value of the field is sought—to determine its desirability for purchase as a whole, for instance—or whether such detailed information is wanted as will closely define the best mining areas, determine the most suitable shaft sites, etc. And, second, the regional character of the principal coal seam, as regards persistency and uniformity of bed section. Thus one good core would "prove" a much larger area of the regular Pittsburgh seam in southwestern Pennsylvania than of the Freeport or Kittanning in the Alleghany Mountain district of that state.

As a rule, where the object of the drilling is to ascertain the general commercial value of the field as a basis for purchase and where the coal beds are fairly regular, as those of the Lower Productive Measures in the northern Appalachian field, one hole for each square mile of area is sufficient. If the property tested is in a comparatively solid block this will place the holes about one mile apart. This rule will usually be found quite satisfactory, though at times a bed in one portion of the field will prove so variable that closer drilling in that particular area will be required. After tentatively locating the drill-holes on a map, the points selected should be visited on the ground, where it will frequently be found desirable to shift them somewhat that the drill may be readily set up, on firm ground and near water.

In a hilly region the location will naturally be selected in valley bottoms, if possible, to avoid needlessly deep holes. A local prejudice against such locations will sometimes be found, based on a belief that the underlying coal seams have been disturbed by the streams. Generally speaking, there can, of course, be no relation between a valley and the character of the much older strata in, and over which it courses. If the coal seam has not been actually reached by erosion, or, in other words, if the natural, stratified roof is found above the coal, it is safe to assume that a core from under a valley is as typical as one from beneath a hill. It rarely happens that erosion has extended more than 50 ft. below the present surface even in a flat valley, so if the coal bed sought lies at a greater depth than that it will usually be found intact.

## Character of Drill

The most satisfactory machine for the work under consideration is the light, easily moved diamond drill of a type similar to that generally used in the coal fields east of the Mississippi River. It consists essentially of a hollow stem about 6 ft. long, held in either a vertical or inclined position and moved upward or downward by two hydraulic pistons. The drill rod passes through this stem, in which it is clamped by a chuck at the lower end and the whole is rotated by two small steam engines. This apparatus, together with a small boiler, a steam windlass for lowering and withdrawing the drill rod and a pump, for forcing the water down the drill rod, and supplying the boiler, are all mounted together on a wheeled truck. The whole weighs about three tons and can be hauled to any ordinary location by two teams.

The main accessories are derrick poles, drill-rod sections, core barrels, hand tools and, where the location is more than a few feet from the water supply, a mounted pump and boiler with 1-in. water pipe and a small tank. The entire outfit can be moved over fair roads by seven teams and set up by three men in 10 hr., or dismantled in half that time. The best results in coring bituminous coal have been obtained in using an eight- or ten-diamond bit attached to a double core barrel and cutting a core 2¼ in. in diameter. A careful driller thus equipped will usually secure a perfect core even of the soft, low-volatile coals; indeed it is customary for him to guarantee such a core when drilling in fields with which he is familiar.

The speed of drilling with such an equipment naturally varies with the character of the strata penetrated and the skill of the driller. In the ordinary Carboniferous shales

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and sandstones 50 ft. per 10-hr. day of steady running is a good average, though occasionally more than twice that speed will be maintained for a single shift. In estimating the *total* time required to drill a field one should allow a shift of 10 hr. for each 20 ft. of hole to be drilled by one machine. This is generally sufficient to cover the time consumed in moving to new locations, laying water lines, maintaining bits and machine, and redrilling an occasional hole where a core has been lost.

The amount of fuel required for such drilling may be roughly estimated at one-third bushel of coal per foot of hole, or a long ton per one hundred feet. If a separate pump boiler is used, the fuel allowance must be increased somewhat, probably to one and one-half tons per hundred feet of hole. The water requirement of a drill in full operation is about two-thirds of a barrel per minute. Considerably less will suffice in an emergency if the discharge from the hole can be repeatedly pumped back into it; but this is not always possible, owing to rock fissures, through which the water sent down the rod escapes. As already stated, an auxiliary pump and boiler are necessary if the location is more than a few feet from water. The type generally used will force sufficient water for drilling for about a mile against a moderate head.

### Form of Contract

Most drill prospecting in the Eastern coal fields is done, under supervision, by special contracting firms. Under the contract usually in force the drilling company agrees to furnish a certain number of machines with all necessary appliances and men for their proper operation; to transport the equipment into the field; to move it to the various locations assigned; to supply all fuel and water; to drill holes of a specified size to the depths desired by the engineer in charge, and, usually, to furnish perfect cores of the coal seams penetrated. The maximum and minimum depths to which any hole may be carried is usually specified; also the minimum total amount of drilling to be done.

The contract price for such work in the Pennsylvania coal fields, when several thousand feet of drilling is to be done and the maximum depth of hole is approximately 600 ft., averages about $1.75 per foot for a hole yielding a 2¼-in. core. In less accessible localities, farther from the base of supplies, as in many portions of West Virginia, Kentucky, Illinois and the Middle West, the contract price ranges from $2 to $2.50 per foot, or even more if an exceptionally hard formation—such as the Raleigh Sandstone of the New River field in West Virginia—has to be penetrated.

### Supervision of Drilling

Usually the engineer in charge of drilling operations is responsible for the accuracy of the reported records rather than the drill contractor or his machine runner, and very properly so. As large expenditures of money for purchase and mining development are frequently based wholly upon the records of a few holes, it is essential that the supervising engineer know, beyond all reasonable doubt, that the coal cores secured, represent the full thickness of the beds, and not be dependent on the word of the driller, who is sometimes tempted to overlook a few inches of ground-up core—especially when his contract calls for the hole to be redrilled unless complete coal cores are obtained.

To secure these results it is not necessary that the engineer remain constantly at the drill, but only while the coal and a foot or so of strata immediately below are being cut. His free time can be advantageously utilized in safeguarding his employers' interests by familiarizing himself with all the local conditions and in general surveying as a basis for his complete graphic records.

The time of striking a given seam can usually be predetermined with some accuracy if the structure and geologic section of the field are at all regular. When the driller reaches the coal, which can be readily told by the action of the machine, he at once stops and sends for the engineer. After the latter marks the position of the drill rod the coal is cored and the point at which the floor is struck is noted. Measuring between these two points gives the total thickness of the seam. When the drill has gone a foot or so into the floor, to give a hold for the key piece, the rod is drawn and the contents of the core barrel carefully pushed out. Detailed measurement of the coal core can then be checked with the rod measurement, from which it should not vary more than an inch.

There might be raised the objection to this method that an unscrupulous driller, fearing he would grind up and lose part of the core, would run some distance into the bed before calling the engineer and thus have less core to account for than should properly be present. But this is most improbable, for no driller could tell just how much of the core he would grind up, and if he should produce more than the rod readings called for his deception would be at once apparent.

It is well to have a long, narrow box in which the coal core will fit snugly when pushed from the core barrel, as it is sometimes very tender and difficult to measure accurately unless prevented from falling to pieces. Usually it is best to let the core dry before it is finally measured in detail and broken up for chemical analysis, as bony coal and small partings of bone or black slate are apt to be overlooked in a wet core.

### Instrumental Surveys and Office Records

To properly interpret the results of drilling a series of holes it is essential that both the position and elevation of each be known. Neighboring mines or outcrop openings should also be located for the light they may throw on structural and other conditions in the field, and all referred to a definite bench mark in the district. A stadia survey is usually sufficiently accurate for the purposes involved in the examination. If so, it is particularly desirable because of the rapidity with which the surveyor can obtain, not only the locations and elevations of the drill holes and coal exposures, but also a wealth of topographic and cultural data useful in preparing a general map of the field.

The common method is to measure the distances by stadia on a self-reading rod, the horizontal angles by compass and the vertical angles, from which elevations are calculated, by reading the vertical arc on a carefully leveled transit. When running a continuous line the transitman and rodman occupy alternate stations, the transit pointing first back then ahead. In a fairly open country two men can readily average four miles of line a day.

Drill records are usually most intelligible when seen in graphic form where the character of the various strata

penetrated, the relative position and thickness of the coal seams, and the variations of these features in different parts of the field can be comprehended at a glance. A scale of 40 ft. to 1 in. has been found suitable for plotting the drill logs, though it is usually desirable to supplement these records with magnified sections of the coal seams plotted on a scale about ten times as large.

The map accompanying the plate of drill records should show the location and elevation of each hole and coal opening; the lines of the property tested; the drainage and important culture and geographical features of the field and, by contours based on survey elevations, the structure of the principal coal seam. With such data at hand the engineer is able to discuss intelligently and with a fair degree of accuracy the geologic conditions of a field; to determine its economic value, and to outline a general plan for future development. The cost of such methods of investigation amounts to such a trifling sum per acre of coal involved that, viewed as a tentative or permanent record, there can be little doubt of its value and expediency, particularly so with the advancing prices of good coal lands and the greater security vouchsafed to any professional opinion which may be rendered in the premises.

## A New Rotary Dump

The rotary dump here illustrated is a type used by the Rheinischen A. G. für Braunkohlenbergbau und Briquettfabrikation, Cologne, Germany. It is described by Christian Steg in "Glückauf," Oct. 12, 1912.

From the central switching station the cars are distributed to the several dumps, run upon them by gravity and after dumping pass on to a chain road for the empty cars.

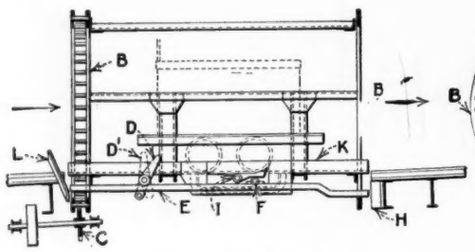



FIG. 1. SIDE VIEW

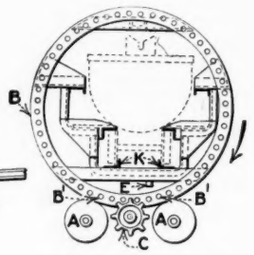



FIG. 2. END VIEW

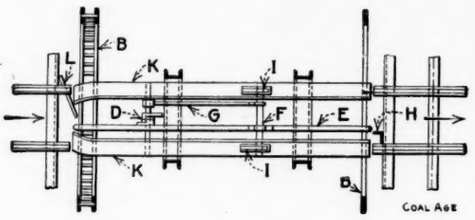



FIG. 3. TOP VIEW

The dump is adapted to the form of the car, and it is mounted in the usual manner on four rollers *A* which support its two end rings *B*. It is inclined as is the approach track. The double ring *B* at the front is provided with pins to form a lantern gear meshing with the driving pinion C. The pins of this lantern gear are lacking, however, for a distance of about 20 inches, between the points *B'* and *B''*, Fig. 2, which interval corresponds to the initial and final position of the dump rotation. Thus the pinion C, which keeps on turning, has no further effect upon the lantern gear when this open space is reached.

The axle of the car, in running upon the dump pushes down and passes over the lever *D*, which moves the longitudinal bar *E* away from the catch *H*. The weight of the car upon the rails (which are not in the exact center), then starts the dump in its revolution.

As soon as the open space above referred to in the lantern gear has been passed, the pinion *C* meshes therewith and causes the dump to turn completely over. Upon nearing its initial position, the guide *L* forces the locking bar *E* back into its former place, thus locking the dump upright, in which position it remains until the next car is run upon it ready to be emptied.

## Coal Mining in Holland

SPECIAL CORRESPONDENCE

From a return dealing specially with the Limburg (Holland) coal industry, it appears that in 1911 the coal raised from the seven mines working amounted to a total of 1,654,240 short tons against 1,447,040 tons in 1910 and 1,255,520 tons in 1909. The total number of workmen was 7477 of whom 5499 were below the surface and 1978 above. They included 6122 Hollander, 1397 Germans, 200 Belgians and 244 Austrians.

Dealing specially with the state-owned mines, the report states that a fair tendency is noticeable toward the nationalization of the Dutch Limburg basin, the determining reasons being on the one hand, the increasing competition in Holland of the German-Westphalian Coal Syndicate and, on the other, the apprehension that concessions granted to Dutch firms may pass into foreign hands.

The state-owned area extends over 62,600 acres, containing an estimated total of a billion tons, of which 593,000 lie at a depth of less than 3281 ft. or 1000 m., as compared with an area of 17,291 acres in the hands of private firms. The only state-owned mine in regular exploitation is the Wilhelmina, which was responsible for a total of 275,555 tons in 1911. About 65 per cent. of the state output was sold abroad.

Work is still in progress for completing the two shafts of the Emma Colliery, sunk by the freezing process. These in 1911 produced 662 tons. The coal formation was reached at a depth of only 650 ft., and four workable seams from 27½ in. to 47 in. thick were intersected at between 650 and 912 ft. At the third state-owned mine, Hendrik, a depth of 722 ft. of cap rock had to be passed through before the coal formation was reached.

It is estimated that when completed the Emma and Hendrik Collieries will yield 3400 tons daily. The probable production of the state collieries is put at 672,000 tons in 1915 and 3,920,000 tons in 1930, the number of workmen occupied being estimated at 3000 in 1915 and 17,000 in 1930, and the capital invested at $12,000,000 in 1930, against $3,200,000 at present.

It is claimed that the increasing invasion of the Dutch market by German coal is attributable to the reduced railway tariffs and the low freight rates on the Rhine.

# Switch Gear for Collieries

The development of switch-gear design has of late years received a considerable impetus owing to the remarkably rapid way in which electric power has been adopted for use in collieries and other mines. The problems attending the use of power in such situations make electric mining machinery a class by itself, since not only is the danger of coal dust and gas to be contended with, but the necessity of placing machinery in dark and damp situations under the control of inexperienced workmen have introduced difficulties which it has taken a considerable amount of careful design to overcome.

## Two New Pieces of Apparatus

Among the firms who have carefully investigated the problems of mining machinery is the Morely Electrical Engineering Co., Ltd., of Stanningley, near Leeds, and two of their latest productions in mining switch gear are worth attention. It is therefore proposed to describe briefly, first an oil-immersed drum type starter and controller, which is shown photographically in Fig. 1.

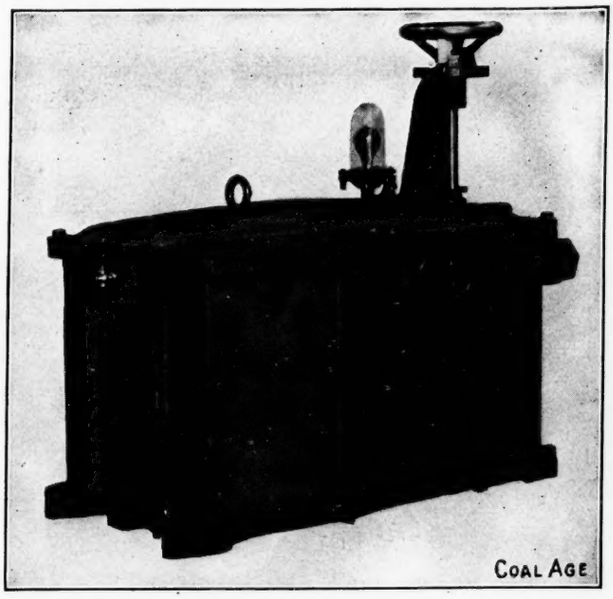



Fig. 1. Oil-immersed Starter and Controller

Those who have had experience in the manipulation of colliery switch gear for direct current, know that although there is a great advantage in having the switch resistance and joint boxes combined in one self-contained, transportable or semi-transportable box. Many designs which have been previously attempted on these lines have not been entirely successful on account of the fact that the work of inspection, always difficult in collieries, has been impeded by the way in which the parts of the gear have been arranged with relation to one another inside the case.

Where bad lighting is the rule rather than the exception, it is extremely desirable that the utmost facilities for inspection of the working parts should be given, and it is in this feature that several of the previous designs have to some extent failed.

This disadvantage, in the present instance, has been avoided. By means of hinging the two drums and also by a suitable arrangement of the plugs, a few minutes will suffice to dismantle the whole of the switch gear and thoroughly inspect the same.

It is hardly necessary to describe this device to any great length, but it may be said that the general specifications conform in all particulars to the British Home Office regulations for apparatus used generally in mines. The design allows of a certain flexibility of arrangement and as no two collieries are alike in desiring the same class of apparatus, the manufacturers are able to vary the position of the component parts in order to suit individual requirements.

## A Double-pole Mining Switch

The second piece of apparatus of interest which this firm has recently placed on the market is the double-pole mining switch of the oil immersed type, with patent fuses and joint boxes, shown in Fig. 2. When the switch is placed in the off position, there can be no possibility of its being turned back again unless the man in charge of the machine which it controls unlocks the switch frame.

This voluntary act prevents any unauthorized person from tampering with the fuse or putting larger sizes of conductor into the fuse holders than the current of the machine warrants. That this is important will be readily granted, inasmuch as considerable damage has before now been done in mines, owing to unauthorized tampering with fuses.

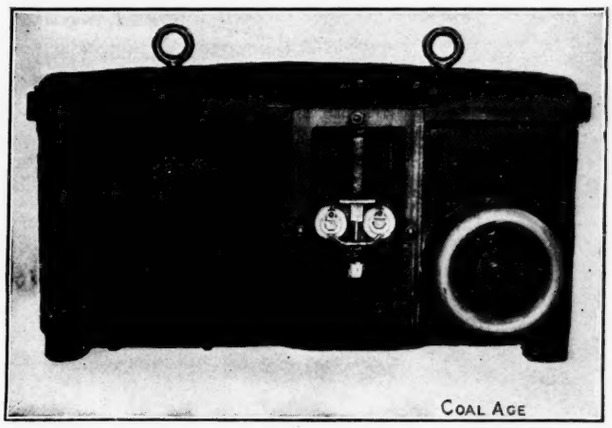



Fig. 2. Double-pole Mining Switch

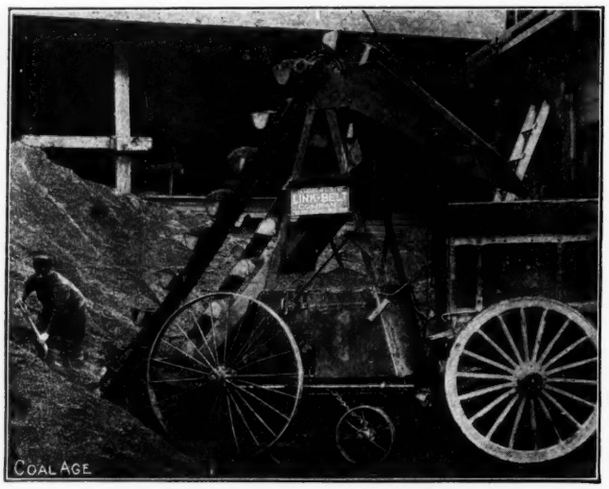
These switches have been standardized and made in various sizes from 25 to 250 amp. capacities, and have been found especially suitable for controlling coal cutters, drills and similar mining machinery. It will be seen also that this type of switch gear lends itself equally to use in such situations as flour mills, powder factories, or other dangerous places, and therefore possesses a wide range of technical interest.

The U. S. Geological Survey classifies land as coal land only when the coal lies at what is now considered a minable depth in this country. The character of the coal determines the depth to a certain extent. The higher-grade coals are allowed a maximum depth of 3000 ft.; less is allowed for poorer grades. Lands underlaid with coal at a depth of 3500 or 4000 ft. are classed as "non-coal" lands. The amount of coal below 3000 ft. has not yet been estimated, but it is without doubt large. The coal above this depth is estimated by the Survey to be 2000 billion tons. Less than 11 billion tons have been mined. A large part of the estimated 2000 billion tons consists of the comparatively low grades of lignite.

## Loading Coal for the Retail Trade

Mechanical loaders for loading coal wagons from storage have fairly jumped into prominence. A year and a half ago there were probably not over half a dozen in use the country over, while now hundreds are in successful operation. This method of loading wagons is such a decided improvement over the hand-shoveling, that manufacturers are finding it difficult to build enough machines to meet the heavy demand.

The accompanying illustration shows the Link-Belt Wagon Loader in the yards of the Scranton & Lehigh Coal Co., of Brooklyn, N. Y. This is the company's standard Type "D" bituminous loader, which will load a 2-ton wagon with bituminous or small anthracite coal in about two minutes, or a 5-ton truck in five minutes. It fills a




THE WAGON LOADER AT WORK

wagon so quickly that it hardly pays the driver to leave his seat, if the loader can be fed without his help. Where considerable coal is handled and rapidity of loading is essential in order to avoid delaying teams, greater capacity is secured by using another yard man to feed the machine, in addition to the operator. The driver then stays on the wagon and simply trims the load. Operating in this way an average of 40 or 50 tons an hour, or 400 to 500 tons in ten hours can be loaded.

The Link-Belt Co. has recently published a 16-page book which describes the method of operating the machine and the results to be expected with it.

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## Acetylene Lamps Permitted in Ohio Mines

Section 974 of the Ohio General Code has recently been amended by the General Assembly. One item of revision provides that it shall be lawful to use acetylene gas in lamps in mines subject to the following conditions and restrictions:

First, no person shall take into a mine a greater quantity of calcium carbide than will be a reasonable supply for his own lamp for one day's work.

Second, no person shall deposit, or keep in his possession, in a mine any calcium carbide, or refuse therefrom, in anything except air-tight containers These containers must be taken out of the mine at the end of each day's work.

Third, no person shall be allowed to use acetylene gas in lamps where there are old or abandoned workings, where large quantities of blackdamp or other poisonous gases are liable to accumulate, until such places have been examined by a competent person and pronounced free from a foul or poisonous atmosphere.

Up to the present time all efforts to introduce acetylene lamps in Ohio mines have proved unavailing. The Ohio Mining Law as amended June 11, 1910 (Section 974), it may seem, was drastic in respect to the use of acetylene or carbide lamps in the mines. The position taken by the commission appointed to revise the mining law at that time was that, owing to the many dangerous conditions incident to the use of calcium carbide for the generation of acetylene gas, in the mines, the use of this lamp should be prohibited by law.

This ruling of the commission, it may be supposed, was not wholly acceptable to all classes of mining men and efforts have been made from time to time to overcome the prejudice that existed in the Department of Mines of Ohio against the use of the lamp.

Under the new administration these efforts have been successful, and Section 974 of the mining law was revised Feb. 13, by action of the Ohio Assembly. The revised law was approved by the governor, Feb. 24. In justification of the previous action of the Mining Commission in this regard, it may be stated that the section as now amended provides certain restrictions, which cover all of the objections raised against the use of the lamp in mines.

## BY THE WAY

Advice after mischief is like medicine after death.

❋

First driver to second driver: "Lend me your pipe and tobacco and be fumbling for a match while I'm filling up." Second driver: "——— —— ———."

❋

It is easier to bear adversity than to forget prosperity.

❋

The flywheel of any industry is in its storage capacity, and as most coal will not stand storage, the greater part of the coal industry is reciprocating without a flywheel.

❋

Many people see a glow-worm and think it a conflagration.

❋

The man who holds the bag sins as much as the one who puts into it.

❋

A mining camp weekly says: "Apparently we were erroneously informed as to the nationality of Joseph Remas, as in our account of the burglary at the A. C. M. Co. store, we stated that he was a Finn. Later we were waited upon by a delegation of that nationality whose sensibilities were highly outraged by the statement. We apologized for the error and were informed that he was a Lithuanian. If this is a mistake, we are prepared with another apology," which goes to show that the way of the editor is hard.

❋

When we are in the valley we should act in such a way that we need not fear those who stand on the hill.

❋

Mine Inspector James Taylor, 4th District, Peoria, Ill., has issued a neat booklet presenting the Compliments of the Season, 1913, and extending "greetings" to the coal operators and all employees in and about the mines. He reports but one fatal accident having occurred in his district during the first six months of the fiscal year. To everybody Mr. Taylor says: "Don't fail to brighten the usual gray of life with a bit of the rosegold of kindness." He then gives a series of "Don'ts" for operators and superintendents, mine managers, miners, mine examiners, shotfirers, hoisting engineers and drivers. The ground of necessary precautions in coal mining is pretty fully covered by these worth-while suggestions.

# EDITORIALS

## Storage of Powder

A few years ago the coal industry began to realize that an urgent campaign must be made to protect the miner at his work, but more recently operators have begun to take the larger view that workmen should also be taken care of at their homes.

Unfortunately when laws were made restricting the amount of powder which might be taken into the mines at one time, the ordinance made it necessary that each miner should either buy powder in small quantities, which was an extravagant practice, or store a broken keg of powder at home. At one mine, a genial clerk of the commissary, on his own responsibility, agreed to keep the partly used powder supplies of the miners in his "general supply house" and dole out the powder to each man as he desired it, supplying every individual from his own keg until that receptacle was empty.

The mine inspector arrived and condemned this practice, which, of course, was dangerous, as the miners persisted in calling for powder with lighted lamps in their hats, and, it being winter, there was an open fire not far distant. So the miners reverted to the old practice which was at least as bad. They took the powder home and left it often where the children could play with it, subject to fires should the house burn, a danger to neighboring houses and a terror to the local fire department.

Powder cannot well be sold like milk, of which a certain amount is purchased each day, the consumption always being regulated by the consumer to equal the quantity ordered. The men use part of a canister of powder one day and on the day following have less on hand than will serve them for a full day's run. Consequently, they desire to purchase a quantity running to a certain number of odd pounds or even ounces, only to be determined by weighing the can from which the powder is transferred both before and after depletion. This involves excessive clerical work, which it seems reasonable to add to the price of the powder.

Every coal company should have, in addition to the regular storehouse, a safety magazine where the miners may store their powder and where their cans may be filled every night. They should never be permitted to enter the magazine and no stove should be allowed within its walls. The men should be obliged to leave their depleted kegs at this place of storage and on quitting the mine at night should deposit their numbered canisters for storage and replenishment.

This will not only serve the purpose of safety, but should also lower insurance risks. In Great Britain the men are required to bring out their canisters nightly.

The Coal Mines Order of 1911 reads:

> No explosive substance shall be stored underground in a mine. The owner, agent or manager of the mine shall provide a suitable place or places of storage above ground for all explosives intended to be used in the mine and shall make suitable provision conveniently near the entrance of the mine for the storage of surplus explosive brought out of the mine at the end of each shift.
>
> If any explosive remains in the possession of a workman at the end of his shift, either he shall bring it with him, out of the mine and return it at once to the place of storage provided for the purpose or if the explosive is required for a shift immediately following, he shall deliver it personally to the workman succeeding him in his working place.

In view of the possibility that explosions may occur from the falling of rock on canisters of powder, it seems desirable that the American operators should require here what the law demands in Great Britain, that every man bring the remnants of his day's supply of powder to the surface when his shift is done and deposit it in a magazine.

In places where cartridges of permissible explosives are sold, there is less difficulty in arranging the sale of the powder in small units, but the need for a place for storage over night and idle days should be carefully considered in this case also.

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## The Need of Efficient Mining Legislation

Much confusion is liable to exist in the minds of legislators, in relation to what is needed or desired in mining legislation. The confusion arises from the variety of mining bills that are being presented for the consideration of the legislature now in session at Harrisburg. While some of the proposed bills that have been brought to our attention contain commendable features and are based upon a practical knowledge of mining conditions and requirements, there are others that have seemingly been drawn more for the purpose of defeating good and needed legislation than to supply a recognized need or to meet certain known dangerous conditions existing in mines. An example of this is to be found in House File No. 592, which is a bill introduced by Representative J. Wilfred Donahoe and referred to the committee on Mines and Mining, Feb. 12.

Mr. Donahoe is a native of Schuylkill County, having been born at Ashland, Nov., 1880, and educated in the public schools of that place. At the time of his election to the House of Representatives, Nov., 1910, Mr. Donahoe was engaged in clerking at a stationery store.

What the author of the bill knows of mining may be judged better by some of the features of the bill. For example, one of its first provisions is that "the Board of Examiners for Inspectors of Mines and the examinations provided for in Art. 2 of the Act approved June 2, 1891, be and are hereby abolished."

The bill further provides for "two chief officers of the Department of Mines, one to be known as chief of the bituminous mining district and the other chief of the anthracite mining district." By the provision of the bill, both of these officers of the Department are to be "elected by the qualified electors of the counties" of their respective districts, "for a term of four years or until their successors are duly qualified."

Under the present law, approved April 14, 1903, estab-

lishing the Department of Mines in Pennsylvania, the chief of the Department is *appointed by the governor.* Under the provision of the bituminous mining law (1911), Art. 19, the bituminous mine inspectors are *appointed and commissioned by the governor,* from a list of names certified to him by the Examining Board. In the anthracite district, under the Act approved June 8, 1901, and amended May 3, 1909, the mine inspectors are *elected by the qualified voters in the counties of the district.* If the proposed bill should become law, the *elective system* would control the Department of Mines as well as the anthracite mine inspectors, leaving the bituminous inspectors to be appointed by the governor.

In abolishing the requirement of the examination of candidates for the office of inspector of mines, the proposed bill provides that

> Any person shall be eligible for election to the office of inspector of mines in the anthracite mining district who shall be a citizen of the State of Pennsylvania, not less than 30 years nor more than 60 years of age at the time of his election, shall have not less than ten years' practical experience as a miner in mines where noxious and explosive gases are evolved and shall have a mine foreman's certificate, granted to him in accordance with the provisions of Art. 8 of the Act approved June 2, 1891, and who has been employed in or about a coal mine within five years prior to his first election to the office of inspector of mines.

By the proposed bill the expenses of the Department of Mines would be increased from the present $19,500 per annum to $21,800, or an increase of $2300 per annum. Instead of the present force of one chief, one deputy, six clerks, three stenographers and one messenger; the working force, under the new bill, would be two chiefs, two assistants, four clerks, two stenographers and two messengers. The clerical force, including messenger, would be reduced from ten persons to eight, with a reduction of $4400 for the expense in the clerical department of the work, while the force of supervision is doubled, with an increase of $6700 in expense for supervision.

No argument is required to show that the work so efficiently done under the present system, would be greatly hampered and its efficiency impaired by the proposed division of the Department. The questions presented are: 1. Is there any existing need for such division in the Department of Mines? 2. Would the work of the Department be conducted harmoniously under two heads?

While the conditions in the two districts, in Pennsylvania, are recognized as substantially different and are regulated by a separate code of laws, the anthracite mine inspectors and the bituminous mine inspectors report to the same head, and we predict greater advantage and harmony in the working of the present system than would exist if the interests in these two districts were completely divorced.

We believe that the committee on Mines and Mining, that must pass on this and other bills before they can be presented to the legislature, will be too wise to handicap the work of the committee appointed some time ago to revise the anthracite mining law. That committee has given much time and study to the conditions existing in the state and the anthracite district, and the report will be presented in due form for such action as the Assembly deems fit. In view of the extended work of the committee and the time it has consumed in the codification of suitable laws to govern the mining of anthracite coal in the state, the introduction of similar bills at this time, would seem to have no other purpose than to block legislation in this regard, by confusing the true estimate of the situation and conditions.

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## The Downsitting and the Uprising

With what deliberate purpose we sit down between the arms of our office chair to think on the whys and wherefores of our tonnage cost, our output and our sales.

It would be well if we would often compel ourselves to re-sit, with the same, earnest, knitted brow, and view awhile in anticipation that unforseen, because unlooked for, group, or it might be even a succession of groups, proceeding slowly, with frequent stops, carrying the injured on stretchers from our mine.

If a stranger were to travel unbidden, without carping spirit or the hope of journalistic reward, the length and breadth of coaldom, we cannot but think he would be impressed that many were the provisions of safety resulting from such downsittings.

But most of these provisions have not come as the result of such deliberation. Too many carry the blood mark on them. It would be well; it would be worthy of this our new century, and this our modern outlook, if we did not wait for misfortune, for maiming, for death, for hecatombs even, before we roll that chair into position and deliberately sit down and review, and again review, the question of safety.

And having sat down and considered, let us go around and explore. It is not here can be written down all the thoughts we will think and the places we will visit.

Let us hark back to our first visit in some large city, recall with what difficulty we found our way around, stopping here and there a man and plying him with the endless question, the way to reach the object of our visit. Remember our strictures on that city for omitted, defaced and misplaced signs and on the pioneers for crooked, happy-go-lucky twisting of the streets.

Cherish that memory; it will help us to understand the predicament of strangers, of that foreigner, newly arrived, who barely learns the way to work and may never learn the way to safety, to whom the maps of our labyrinth are inexplicable puzzles, to whom the general principles on which our mine is based are unknown, who is not enlightened by converse with his more competent fellows.

In semi-darkness, in complete darkness, in terror, facing the eye of death, after cavings have destroyed landmarks, through roadways rarely traveled, he must thread his way to safety. Have we explored that roadway which he will travel if he has the knowledge to choose and the power to reach it, and which he must strive to pass before we, following time-honored precedent, restart the fan driving the afterdamp on him.

Is that roadway free of water? Is it likely to be after the shock has jarred down the slate in the heading? Is it reasonably straight? Can a man in the dark, groping, wandering, ignorant, unerringly follow it? Is it low and narrow? It will be lower and narrower after a fall.

And now let us uprise and make our mine in this and all other ways a compliance with the law, with the spirit of the enactment, nay more, a reflection of this present age of altruism, even more, a foreshadowing of that age of psycho-sympathy which is yet to come.

# SOCIOLOGICAL DEPARTMENT

## How the H. C. Frick Coke Co. Takes Care of Its Men

By Thomas W. Dawson*

*SYNOPSIS—The company realizes that safety is promoted as much by preparedness and discipline as by the introduction of mere devices for protection. The personal aspect of safety is as important as the material.*

The H. C. Frick Coke Co. has carefully considered the risks of mine and village fires. For the illumination of the mines and mine buildings, only the best and safest oils are used. Open lights are prohibited in all buildings around the mine. No oils and explosives must be stored in the underground workings.

Stables, pump rooms, haulage-engine rooms, shaft bottoms, underground offices, and all such places where men might congregate, are of fireproof construction and are kept clean and neat.

All mine rooms, as well as those on the surface, must be well ventilated and kept both neat and clean. Cans are provided for the reception of oily waste, grease, small quantities of oil, etc.

Hay and straw are taken into the mines in bales, not loose. All electric wiring, either for lighting or power, is carefully installed and properly examined at stated intervals. All stoppings and overcasts along main airways are of fireproof construction. In the newer shafts, concrete linings have been provided.

### Village Fire Departments

At every mine there is an organized fire-fighting force. The equipment is standard for all plants and interchangeable. Scattered throughout the towns, as well as at the mine, are hose, reels and drying towers. Fire signals are printed on cards and posted at the convenient points, as is customary in the larger well-ordered towns. Water systems are laid, having sufficient water head for fighting fire. On about every fifth or sixth house in the town you will note a ladder and water buckets ready for immediate use.

All bare power lines underground and on the surface are properly guarded for their entire length by a neat wooden guard, so as to prevent the workman or his tools from coming in contact with the same. To insure the same security, trolley wires for coke-drawing machines are placed at a sufficient height to make contact with tools unlikely.

An improved system for checking men in and out of the workings is maintained at all the mines. This shows *HOW MANY* men and *WHO* are underground at all times.

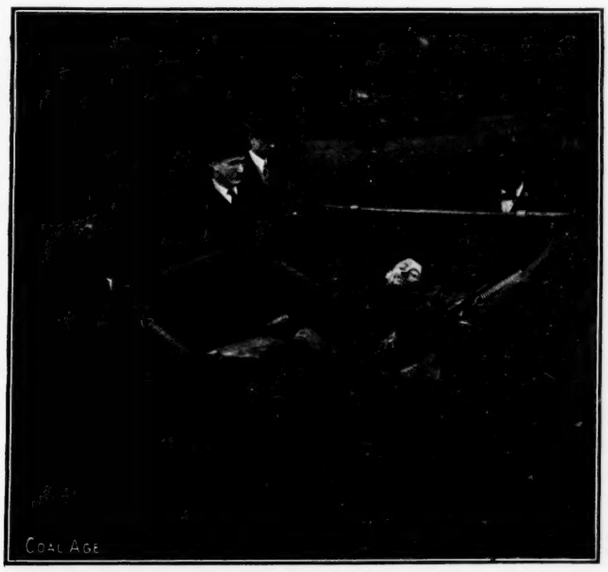
*Assistant chief engineer, H. C. Frick Coke Co., Scottdale, Penn.

Note—Abstract from paper entitled "Welfare, H. C. Frick Coke Co.," read before the winter meeting of the Coal Mining Institute of America.

### The Personnel

Article No. 5 of the general rules provides for the employing of only steady, reliable and sober men as mine foremen, firebosses, master mechanics, hoisting engineers, boiler and fan tenders and stable bosses. The use of intoxicating liquors by any employee on duty is absolutely forbidden.

Article No. 16 of the general rules says: "No one will be permitted to interfere with the religious or political opinions of the workmen, and no superintendent, boss or clerk will be allowed to solicit money or make collections from the workmen for any church, society or association." Employees must have permission to be absent from duty.




A Spring Stretcher for Use in a Mine Car

The company employs four mine inspectors, one of them acting as chief. It is the duty of these men to visit each and every mine, and thoroughly inspect it at least once every 60 days, reporting the result of his inspection in writing to the general superintendent. When an accident does occur in or about the mine, the chief mine inspector of the company promptly visits the scene of the accident, gathers all the data he can relative thereto, and makes a sketch of the surroundings.

Immediately this sketch is put into permanent form, blueprinted and sent to each mine with a circular letter giving a full account of the accident, and making suggestions for preventing a similar one. This circular and plan is discussed at a meeting of the local officials at each and every plant and methods are devised for preventing similar accidents at their mines.

### The Weekly Council

Once each week the superintendents of every mine and their subordinates meet and discuss mine conditions and

operations generally, and especially matters pertaining to the protection of the lives and health of the employees, and the care and safety of the property. The discussions at these meetings are reported to the general superintendent each week. Then there are general meetings at stated intervals held at the main offices; these are attended by the superintendents of all the plants, and the heads of departments.

There is a separate and distinct plan for the future working of each mine. This plan provides a layout which will assure the best results. Specifications are written for each mine, stating where and how the mining is to be done. These are signed by the company's chief engineer, mine inspector, division engineer, superintendent and mine foreman, to show that they are all familiar with the plan for working each mine.

Projections are made for the workings far in advance of the actual work, and the haulage and ventilating problems planned so that when the mine is developed the best systems are in use.

The officials of the company periodically make a detailed inspection of each and every mine, insuring that their instructions, and the best methods are actually followed at all mines.

### The Committee of Safety

In addition to these precautions there is appointed at each mine a committee known as a "Safety Committee." It is composed of three or four men chosen from the various occupations in and about the mine, and it is their duty to inspect periodically the working places, roadways, ventilation and any other things which in their opinion might be the cause of an accident.

They report their findings in writing to the superintendent of the mine, who forwards the same to the general office. These suggestions are immediately acted upon, and any and all dangers, should there be any reported, are removed as quickly as possible. Thus there is a frequent check on the general condition of the mine, and a stimulus to mine officials to keep everything in first-class condition.

All "new" or "green" men are conducted to and from their work underground, and this is continued as long as it is necessary to acquaint them with the traveling way to and from the surface. Should an employee not return from the mine in due time, after the day's work is done, a search is at once made for him.

Reports are made daily by the firebosses, shotfirers and mine foreman. These reports eventually get in the general superintendent's office, so that he is in close touch with existing conditions in detail.

### Central Stations for First-aid and Rescue

This company established the first rescue and first-aid station in the bituminous-coal fields of the United States, aside from those which were established by the government. Three stations are now maintained, one at Leisenring No. 1, one at Buffington, and one at Hecla No. 2. They are fully equipped with the best apparatus and accessories obtainable.

There are 36 trained corps of five men each which practice quarterly, and twice that number of men are fully trained and qualified in both rescue and first-aid work. A certificate is issued to each man on completion of the course, and a card is given him which is his credential, permitting him to use the oxygen helmet at the time of an accident.

The company has spent $20,000 on this work in one year, about one-half of which went as wages to the men who attended practice. Before a man is allowed to practice rescue work, he must possess a doctor's certificate showing that he is physically fit to train and perform the labor incident to that work. Every corps elects its own captain or leader, and consequently a man is chosen in whom they have confidence. Printed regulations for rescue-corps men are freely circulated.

### Local First-aid Stations

To supplement these rescue stations, pulmotors or resuscitating apparatus are kept at many of the mines throughout the region. By their prompt application a number of employees have been resuscitated after severe electrical shocks and similar accidents.

There are 180 first-aid teams fully organized and qualified to render first aid to the injured. For the purpose of increasing proficiency, local contests are held from time to time. Much interest is manifested by these first-aid men, and in the miners' contest held by the Ninth International Red Cross Conference, in Washington, D. C., the team from Phillips mine won first prize, a silver loving cup.

Emergency hospitals fully equipped have been provided at a number of the larger mines, and the company is contemplating erecting one at each of its operating mines. Underground, in close proximity to the various working sections, can be found first-aid rooms, in which are stored stretchers, blankets and such accessories as may be needed immediately in case of accident. Hospital wagons are used at some of the mines. A device having springs and straps to be applied to the ordinary mine wagon is on hand at each mine. On this the stretcher can be placed and the injured conveyed to the shaft bottom or the surface, without the least shock due to transportation.

(*To be continued in an early issue*)

## A Traveling Hospital

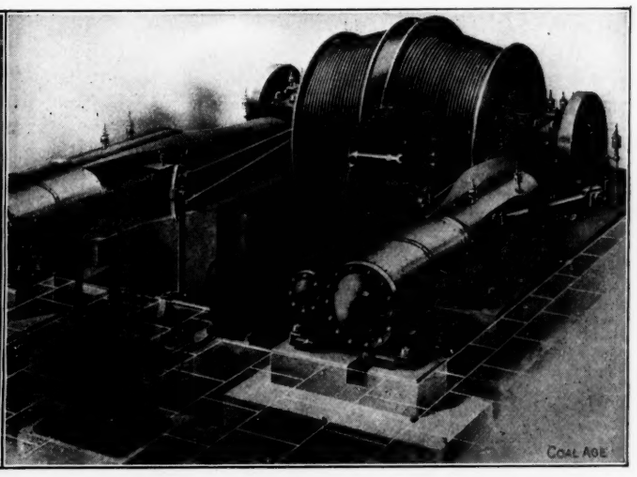
In addition to the elaborate provisions for rescue and first-aid work now in force in the anthracite-coal mines, the Lehigh Valley Coal Co. is just putting into service a mine-rescue car which can be rushed at a moment's notice to any colliery in case of accident. This car consists of a remodelled passenger car equipped with oxygen-breathing apparatus and every kind of first-aid equipment.

It has six complete Draeger oxygen-helmet outfits, by means of which the wearer can breathe for two hours in a gas-filled chamber, with the necessary auxiliary equipment, resuscitating apparatus consisting of pulmotors, stretchers, blankets, splints, antiseptic cotton and provisions for setting up a small commissary in the field.

It will be used as a hospital and ambulance car combined, and rushed on call by special train service to any colliery where an accident has occurred, and will be manned by a crew of thoroughly trained helmet men. As there is already a corps in every mine, specially trained in first-aid work and a small hospital with similar first-aid facilities at the foot of all the working shafts, this additional service will complete the provisions for the comfort and safety of the injured mine workers.

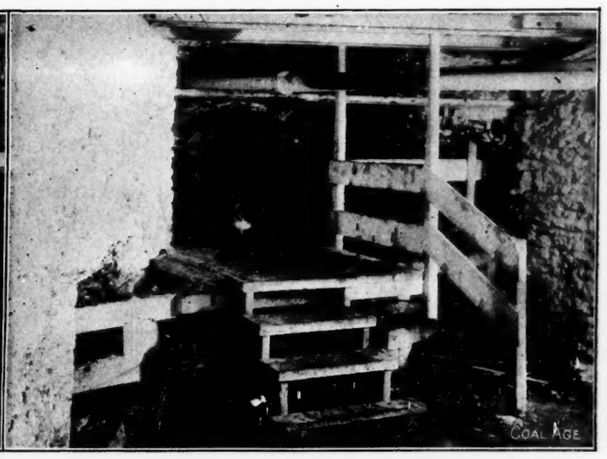
# Safety Provisions of H. C. Frick Coke Co.

STEEL DOORS TO DROP OVER SHAFT MOUTH IN CASE OF FIRE

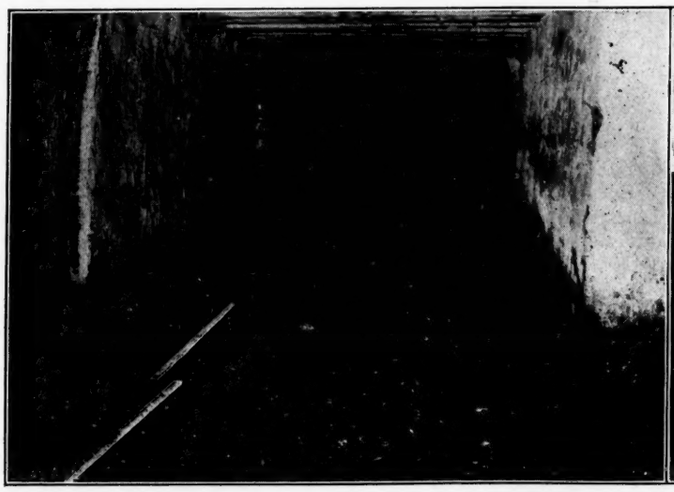



ALL HOISTS ARE PROVIDED WITH OVERWIND DEVICES

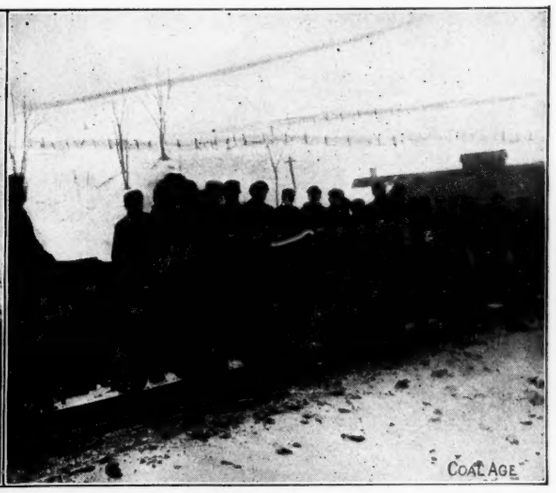
TROLLEY-WIRE PROTECTION AND SIGN POINTING THE WAY OUT




STILE OVER ROPE SHEAVES TO PROTECT TRAVELING MEN



FIREPROOF OVERCAST OF CONCRETE WITH STEEL AND TILE ROOF




ALL MAN TRIPS ARE SECURED WITH DOUBLE SAFETY CHAINS

## Suggestions for Mine Safety

By J. V. Rhodes*

Accidents occasionally arise from persons stepping between dump- and kick-back rails at the tipple. Safety blocks should be placed at this point, so that employees cannot get their feet caught and possibly mashed by the operation of the dump.

Electric lights should be provided at all switches on haulage roads, and the throws for partings should be put on the opposite side from the trolley wire, to keep brakemen from coming in contact with the charged wire.

No motormen should be permitted to make flying switches, as such a practice is dangerous and is prohibited on all first-class railroads. A practice which is dangerous with heavy equipment on a good rail is even more to be feared with light cars on a mine track underground, where in case of a derailment there is no opportunity for escape. The pushing of trips of cars, either loaded or empty, is also very dangerous and should be prohibited.

On delivering empty cars to miners, the driver should ride inside the car at the brake end, and should see that the wagon is properly provided with a "dead block" to keep it from running away from the face. In some cases the miners depend upon the brake to hold the car, and when they start to load coal, the brake is knocked loose by a lump and the car may run on the miner or in the opposite direction, causing an accident either to some employee or to property.

I would recommend that the assistant mine foreman, when hiring a new miner, put the brake on and then pick up a shovel and throw some coal into the car so that it will knock the brake loose. This will show the miner the danger arising from relying upon the brake. Mere explanation may fail to produce the required result, as the miner may not understand what the foreman is endeavoring to tell him.

Many people fail to understand the importance of keeping cars in good condition. One wagon which does not run truly on the track, or which has some other defect, is apt to derail a whole trip and seriously cripple or kill the motorman or brakeman. It is also important that all the bolts on the car shall be thoroughly tightened and the ends cut off flush with the top of the bolt. Otherwise the clothes of men on traveling ways may be caught by passing motor trips.

⁂

## The Canteen at the Coal Camp

In view of the discouraging results arising from the privately owned saloon in mining towns, the Sunnyside Coal Co. has taken a leaf from the past history of the army and established a canteen at Sunnyside, Colo.

W. P. Oakes, vice-president of the corporation, makes the following statement relative to this novel attempt to meet the situation:

"One of the acknowledged handicaps in every mining camp is the character of the saloons maintained there. These bar rooms are generally of a low order; the liquor sold in them is the vilest of the vile, and trouble of one sort or another is always impending. It is useless to argue against the existence of a saloon of one sort or another in or about a mining-camp. If the men cannot get their beer, or whatever they want to drink, they will buy it from bootleggers, who are even less scrupulous than the owners of groggeries. Either they will get their liquid refreshment from this source, or they will go to some other camp where they can obtain it.

"We had our share of trouble because of the existence of a cheap saloon at our camp. Finally seeing that something drastic had to be done, I called some of the men together and we talked it over. The outcome was that we organized a social club and furnished a club house.

"The members appointed an experienced manager, fitted up their club with all necessary conveniences and comforts, ordered only the best brands of beers and liquors, and were ready for business. They decided at the outset that only bottled beer would be handled, and that all drinks would be served at just about a price which would pay running expenses.

"One of the first rules laid down was that the club bar should be open only from 4:30 to 10:30 p.m. This has been strictly enforced. This regulation has resulted in the men retiring early every night, being fresh for work the next day, and starting in with a clear head because drinking is discouraged in the evening, and the club is closed until after working hours the next day.

"To date the plan has worked to the satisfaction of the men and the company, and I believe the system will eventually be adopted in all the big camps in the state.

"The Sunnyside club is fitted with barber chairs and necessary tonsorial equipment, a pool table, several card tables for social games, in which gambling is barred, easy chairs, a library table and other attractive furnishings, including pictures."

⁂

## Fatality Reduction in Anthracite Mines

The number of deaths from accidents in and about the mines of the anthracite region of Pennsylvania decreased from 699 in 1911 to 593 in 1912, according to the annual report of the Department of Mines. This is an improvement of approximately 15.2 per cent. The actual improvement will not be ascertained till it is possible to obtain the number of days worked. It must be remembered, moreover, that one of the two largest mine disasters which have occurred in the anthracite region of Pennsylvania happened in 1911, so that comparisons with that year are misleading.

The number of fatal accidents per 1000 employees decreased from 4.03 in 1911 to 2.86 in 1912. The production of coal per fatal accident rose from 130,067 tons in 1911 to 136,902 tons in 1912. The number of fatal accidents per million tons produced decreased, therefore, from 7.69 to 7.42.

FATALITY TAELE OF ANTHRACITE MINES

| Yearly Average | Employees | Fatalities | Fatalities per 1000 Employees | Output per Fatal Accident | Fatalities per million tons |
|---|---|---|---|---|---|
| 1869-1879 | 55,953 | 225 | 4.02 | 93,288 | 10.72 |
| 1879-1889 | 97,716 | 311 | 3.18 | 122,572 | 8.16 |
| 1889-1899 | 137,790 | 434 | 3.15 | 121,185 | 8.23 |
| 1899-1909 | 160,167 | 549 | 3.42 | 130,256 | 7.68 |
| 1912 | 175,964 | 593 | 2.86 | 136,902 | 7.42 |

This is a gratifying result to the anthracite operators who have spent much money, time and thought in securing safety.

*Mine foreman, No. 2 plant, U. S. Coal & Coke Co., Gary, W. Va.

Note—Abstract from a paper read at the "Safety Boosting" banquet of the U. S. Coal & Coke Co., Jan. 4.

# DISCUSSION BY READERS

## Post Timbering at the Working Face

*Letter No. 2*—It would be useless to attempt to be original in the discussion of such a subject as mine timbering; but I have in mind a suggestion that I believe, if carried out, would have a greater tendency to reduce accidents from falls of roof and coal than can possibly result from the closest vigilance of mine officials.

In Great Britain and on the Continent, the mining laws specify clearly what is called the maximum distance that mine timbers may be set apart and the distance such timbers may be set from the face of the coal. Any violation of this law on the part of the miner, if discovered, is followed by prosecution. It is needless to say that this kind of legislation has had the effect of greatly reducing the rate of accidents from this cause. If good legislation and the enforcement of such laws have been good for Great Britain and Germany, surely it would be worth while to try the effect of the same in this country.

Information on which to base such legislation could be best obtained from the mine inspectors who have good opportunities to know the nature of the various seams in their districts. I believe it would be possible for the mine inspectors, in most mining districts, to determine what should be considered a maximum distance apart for setting post timbers and the maximum distance such timbers should stand from the face of the coal, for different depths of seam and for different kinds of roof, leaving, perhaps, to the mine inspector of the district, the particular classification of the mine in this respect.

Having settled upon the details of such a classification of mines and the maximum distance of timbers apart, for the several conditions, it would be up to the chief mine inspector in each state to urge suitable legislation that would enable the mine inspectors to enforce compliance with such requirements, in their districts. A good law is the first requisite and this should be followed with a thorough discipline in the mine, without which it is impossible to secure the greatest efficiency, safety and economy in mining.

Another suggestion is in regard to the size of timbers sent into the mine, for use in certain places. The ordinary miner does not give any attention to the diameter of the posts that are sent in to him. To most miners, a post is a post, and its length is of the first importance; the diameter concerns him less. I have seen props taken into a mine that were 10 ft. long and only 4 in. in diameter at the small end. Every miner should know that a prop of this kind is out of proportion and totally inadequate to support any reasonable amount of weight.

In post timber, some specified diameter should be determined by those who have the matter in charge. It is also important that all miners should be required to have suitable tools for setting timbers; and, as a further precaution, every miner should be required to demonstrate his method of testing roof and setting a mine post.

I have tried to make these suggestions practical and such as I believe should form a basis for our work in reducing the number of accidents from falls of roof and coal.

WILLIAM CROOKS,
Mine Foreman.

Quinton, Ala.

*Letter No. 3*—The question of timbering at the working face is one that needs careful thought and study. In the first place, the work of timbering should not be planned for the present only but also for the future. What is the working face today will soon be left behind for a road or haulway, and the weight on the timbers will not be less but greater, if anything, as the face is advanced. The timbering, good or bad, will affect the expense of keeping the place open and maintaining the road in good, safe condition.

Mine timbers should be set so that they will conform to the rules and regulations of the mine, and in such a manner and where they will do the most good. In my opinion and experience as a miner, however, there can be no set rule for the placing of props. This is particularly true in the anthracite region.

To avoid accidents due to falls of roof and coal, it is necessary to consider carefully the condition of the roof, having regard to whether it is a hard or soft stone, or a slate or bony roof; as the size of the timbers needed will vary accordingly, from 6 to 12 or 16 in.; although such heavy timbers are seldom sent to the face.

In most anthracite mines, no timber less than 10 in. in diameter should be used. In general, the strata have been very much disturbed and broken. The nature and condition of the roof play a large part and, in fact, are the chief factors to be considered, in timbering. Study the roof and consider whether a large or small prop is needed. Many times a small prop is stood where a large one would be better; and, again, a large one is used where a smaller one would answer the purpose. Props should be stood so that they will give the necessary support and take the weight properly.

The strength of mine timber is important and largely determines its value. The best timber is needed and should be used, as the weight it is required to support cannot always be estimated and varies with different kinds of roof. When the character of the roof and overlying strata are known the style of timbering best adapted to the conditions can be determined; but without that knowledge one is mostly playing a game of chance.

Timbers should be set as soon as possible after a slant slab or other condition that requires special attention has been discovered. Observing this rule carefully will prevent many accidents that occur from falls of roof at the face. A good plan is to always protect the timber supporting the roof, by leaving some coal around the props that will prevent them from being knocked out by the flying coal when a shot is fired. It is always more dangerous to reset a prop that has been once stood and then knocked out, under a bad roof.

The wedging of a post is important. The wedge should cover the whole top of the post and not just a few inches. Proper wedging is necessary to give the post greater resisting power against flying coal to avoid, as far as possible, its being knocked out when a shot is fired.

The life of post timber differs with the kind of wood and the manner and time it is cut, as well as the conditions to which it is subjected in the mine. Props cut when the sap is out of them will last longer than the same timber cut when it is green.

There are good reasons why miners should stand their own timber. This practice will make each miner, to a large degree, responsible for his own safety. If a miner does not understand the roof where he is working, he should be instructed by someone who is competent to instruct him. In many cases, it would be better to take down a bad piece of roof than to attempt to prop it up and hold it in place. There would be fewer accidents at the working face if this was done.

A MINER.

Scranton, Penn.

## Posting a Drawslate

Some time since, notice was sent by the bituminous-mine inspectors to the different superintendents, mine foremen, assistant mine foremen and firebosses, in their several districts, describing in detail the manner suggested for the posting of drawslate (COAL AGE, Vol. 2, p. 258). I would like to draw special attention to a dangerous feature and one that is often overlooked in posting roof slate, at the face of a room. I refer to the possible existence of a clay vein or spar, or a slip in the slate, at the back end of the cut, which is, as yet, hidden from sight, so that it is not detected.

Having this matter in mind, I prepared, a while ago, the following instructions, which were sent to the several mines in my district, asking for the kindly aid and cooperation of all the general superintendents and superintendents in the district, to assist in reducing accidents at the working face, by again directing all mine officials in their charge to urge that every precaution be taken by the workmen to avoid danger from this cause.

In sending out this notice, I was anxious to urge that it is not sufficient for the mine foreman, assistant foreman or fireboss to draw attention to the notice as posted and think that his responsibility ends when he has told the men to set the needed posts. It is important that he should see that his orders are carried out to the letter, as this is the only way to reduce the number of accidents from falls of roof and coal.

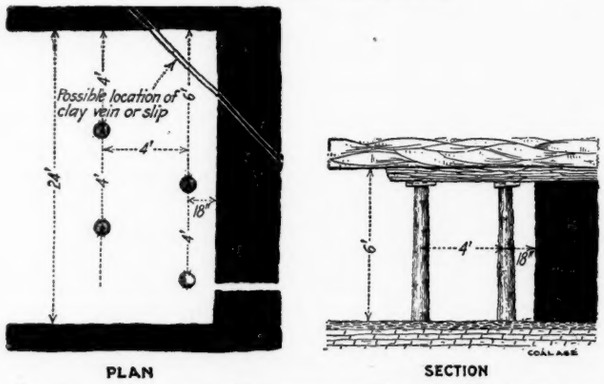
The reduction of fatal accidents during 1912 has been largely due to the carrying out of Art. 4, Sec. 10, and Art. 5, Sec. 3, of the new bituminous-mine law (1911). I wish to express my satisfaction in the generous assistance the operators have given their mine foremen, aiding them to carry out this part of the law. I feel that what remains to be done is to impress upon all mine officials the absolute necessity of seeing that their instructions *are carried out or enforced.*

In this connection, also, I want to call attention to the fact that all coal should be spragged while being undermined, especially in pillar and stump workings, in accordance with Art. 4, Sec. 9. I would also refer to the high percentage of accidents by mine cars and draw attention to the need of widening all old entries where hauling is done, as required by the law, Art. 4, Sec. 8; and where electricity is used I would urge that due attention be given to paragraphs 40 and 41, of Art. 11. In asking this coöperation of the mine officials in the district, I desire to express my satisfaction in the work they have already done in this direction, and my confidence in them that it will still be carried vigorously forward.

CHARLES P. MCGREGOR,
State Mine Inspector, 7th Bit. Dist.

Carnegie, Penn.

Following is a copy of the instructions:




SHOWING POSSIBLE LOCATION OF SLIP IN ROOF SLATE

INSTRUCTIONS TO MACHINE LOADERS AND MINERS AS TO POSTING DRAWSLATE WHILE LOADING OUT A CUT OF COAL.

To Mine Foreman of.....Mine.

.....

The common method of posting along the front of the slate is not safe, as there may be a false slip, clay vein, or spar, at back end of cut of coal, which will throw the posts and slate forward. In order to avoid this, as far as possible, the mine foreman, assistant mine foreman and fireboss should each instruct the men under their charge to put from four to five posts at a point halfway back or near the face of coal, under all slate, in the form of a triangle, the mine foreman to use his own judgment as to the distance these posts should be set apart, as shown on blue print. It would be a good thing to insist on the machine cutters putting a piece of pit rail about 8 or 10 ft. from the rib or pillar, under the coal, as a sprag, which would keep the coal from settling down and allowing the drawslate to sag. All projecting drawslate, both in rooms and entries, to be taken down, also on haulage and travelingways.

The writer would urge the manager, general superintendent, mine superintendent, mine foreman, assistant mine foreman and firebosses to give this matter their most careful consideration. I feel certain that the number of fatal and nonfatal accidents can be reduced.

The mine foreman is referred to Art. 20, Sec. 1, Rule 1 of the mining laws, which reads as follows: "The mine foreman shall attend to his duties in the mine and carry out all the instructions set forth in this act and see that the regulations prescribed for each class of workmen under his charge are carried out in the strictest manner possible." Post this up in a conspicuous place at mine, as provided for in Art. 10, Sec. 12, of the mining laws.

CHAS. P. McGREGOR,
State Mine Inspector, 19th Penn. District.

## Engineers Meeting

The New York section of the American Institute of Mining Engineers will hold its next meeting at the Engineering Societies' Building, 29 West Thirty-ninth St., New York City, on Friday, Mar. 21, at 8:30 p.m. G. S. Rice, chief mining engineer of the U. S. Bureau of Mines, will present a paper on "Notes on European Mining Practice, especially the Methods of the Hydraulic Filling or Flushing of Mines."

# Taxation of Coal Lands

Your editorial on the Tax Valuation of Coal Property, COAL AGE, Feb. 15, 1913, p. 267, advocating a royalty basis of valuation, was evidently written without considering in full the present laws of the state of Pennsylvania. The assessment of lands for taxation in Pennsylvania is made under the Acts of the Legislature of 1841 and 1842, under which all properties must be assessed at the actual value and at such rates and prices as the property would bring at a bona fide sale, after due notice."

In the long, tax litigation that has taken place over the 1907 anthracite assessment, in the Pennsylvania courts, the matter has been five times brought to the Supreme Court on appeal, and the decisions made in these cases must be followed in making any legal assessment. The question of valuation on a royalty basis was brought up in two of these appeals, and the Pennsylvania Supreme Court says, referring to such a royalty basis, (Penn. Supreme Court Report No. 299, page 470):

> Its market value is its fair selling value for cash, not payable as royalty strung out through a long series of years, but payable at the time or as soon thereafter as the value could be determined. Such a method does not make allowance in undeveloped territory for the length of time coal may lie in the ground unmined, undeveloped and unprofitable. It is impossible to reduce to a scientific basis and to mathematical precision the elements of value entering into the present selling price of a tract of coal land. The question is not what earning power coal lands may develop in the future, but what they are actually worth in the market at present.

Further, in the opinion of Judge Fuller, President Judge of Luzerne County, Pennsylvania, No. 614, October term, 1907, sustained by the Supreme Court, it is stated, page 21,

> The law does not sanction a valuation upon coal in place specifically determined by the royalties which it may yield or its availability for market.

Under these decisions, which form the law of the state, it is necessary to assess coal land at its sale value not on a royalty basis, nor on the foot-acre basis, as was previously done; for, in Pennsylvania Supreme Court Report No. 229, page 465, Reading appeal, the Court says,

> * * * * that the foot-acre rule for ascertaining valuation of coal lands of the appellant for the purpose of taxation is not the proper measure of their value * * * *.

Further, it may be pointed out that, under the Pennsylvania law, assessment on similar properties must be equal and, if not so made, may be equalized by the County commissioners. On a royalty basis, the time of mining would be the deciding factor in the value of any property. Calculating the present value on a six-per cent. basis, less the taxes, which must be paid as an annuity and which amount to about 2¼ per cent. of the assessed valuation in Luzerne County at the present time, coal land of a value of $100 per acre if mined now, would be reduced in value to about $42 per acre if it were not to be mined for ten years, or to $11 per acre if standing idle twenty years, and beyond 23 yr., 8 mos. such lands would have a present minus value amounting, at thirty years, to minus $20 per acre, and at forty years, to minus $40 per acre.

Then, on a royalty basis, two adjacent and similar tracts, one opened and in operation and to be mined out in ten years; and the other not to be opened for thirty years, would show radically different values though containing similar amounts of coal of identical value in the market; and further, a mere extension of ownership to include the reserved with the opened tract would change the value of the reserved tract from zero to a very large cash value, which is certainly neither legal under the state laws, nor apparently just to the communities involved.

It seems to me that all taxation of coal or other minerals in the ground is logically wrong. The coal has no value until it has been mined and prepared for market.* The amount of mineral, its availability, and the duration and cost of working are all undetermined and undeterminable factors, which, used as a basis for assessment only lead to dissatisfaction and litigation. The proper method of taxation of all minerals would be a tax on the value of each year's output, at the rate assessed for that particular year, including taxation of surface improvements and machinery the value of which is readily ascertainable, but not including any valuation for mine openings, which are incidental to the mining of the mineral and which on its exhaustion are no longer of any value.

Thus, a colliery producing 1,000,000 tons of anthracite in 1912, with a value at the breaker of $2,500,000, should pay taxes in 1913, at the regular rate for that year, on a valuation of $2,500,000, regardless of the area of coal land tributary to such a colliery. This method is clearly unlawful under the present Pennsylvania law, and would require special legislation to put it in force. However, such a system if legalized would possess the advantage of doing away with all uncertainty and litigation as to the assessed valuations, and would result in the payment of taxes in greatest amount, at the times and in the localities of greatest production and consequent greatest population and greatest need for money; and, by concentrating taxation on the land being most actively worked and relieving reserve land from its present almost insupportable burdens not only of taxation but of litigation, it would tend to the conservation of the unreplaceable coal resources of the community by encouraging the complete mining of lands once opened, including all workable beds large or small, rather than the opening of the best beds on all lands, to obtain immediate earnings even at the cost of injury or destruction to interstratified, smaller and less profitable beds.

R. V. NORRIS,
Consulting Engineer.

Wilkes-Barre, Penn.

[The arguments of Mr. Norris are familiar to us, as are also the Supreme Court decisions. The main question is concerned with the methods of determining actual present value. How does a competent well informed engineer arrive at such value? Naturally, by the method suggested in our editorial, which is the method used by such authorities as Joseph H. Harris, and the late W. A. Lathrop in determining the value of coal lands as the security for issues of bonds, etc. *The statement that coal has no value till mined and prepared for market does not agree with the Supreme Court decisions quoted.

If no common-sense method of valuing property exists under present judicial interpretation of the laws, is it not time to devise such a method, and if necessary to revise the laws for that purpose? We would like to hear from other engineers who have ideas in this matter.—EDITOR.]

# INQUIRIES OF GENERAL INTEREST

## Blowing vs. Exhausting in Fan Ventilation

Will you kindly inform me whether there is any difference in the pressure that a fan will produce at a given mine when blowing or exhausting, under the same conditions and at the same speed.

For example, suppose a reversible fan, at a certain mine, produces 60,000 cu.ft. of air at a given speed, under a water gage of one inch; and suppose it is desired to reverse the air current by shifting the doors in the fan drift so as to make the fan blow the air into the mine instead of exhausting the same from the mine. For the same quantity of air in circulation, will there be any difference in the water gage and, if so, why?

J. A. McD.

Reserve Mines, C. B., Nova Scotia.

For the same quantity of air in circulation in the mine, there will be no change in the ventilating pressure or water gage, unless there are natural or secondary air columns in the mine that act for or against the circulation, or some other obstruction exists that makes the flow of air in one direction easier than the flow in the opposite direction. Either of these conditions would change the observed water gage, for the same circulation of air.

A secondary air column might easily exist in a shaft mine or in a seam of steep inclination, owing to the heat radiated from steam pipes in the shaft or slope. This air column would act to assist the general circulation when such shaft or slope was the upcast, but would oppose the circulation when the air current was changed so as to make the same shaft or slope the downcast. Without knowing these conditions it would be impossible to state what change of pressure would take place when the fan was reversed.

In this connection, it is necessary to remember that it is the resistance of the mine airways, including the shafts, both downcast and upcast, that produces the ventilating pressure or water gage. Without this resistance there would be no pressure, but the power of the fan would be wholly exerted to produce a high velocity of the air current. There are still other conditions affecting this question besides those we have mentioned.

When the fan is exhausting, it is filled with the mine air, which may be warmer or colder than the outside air and may contain gases that are lighter or heavier than pure air. When the fan is working on heavier air, a greater power is required to produce the same speed of revolution of the fan and, *vice versa,* when the fan is filled with lighter air, a less power is required to produce the same speed. It may be stated that the power applied to the fan shaft varies as the *square* of the efficiency of the fan, the *fourth power* of the speed and the *square* of the density of the air passing through the fan; and *inversely* as the resistance of the mine, the latter being measured by the product of the unit pressure and the sectional area of the fan drift. It is readily seen from this statement and the foregoing explanation that the question of how the reversing of the air current in a mine will affect the water gage, cannot be determined, except with a full knowledge of the conditions.

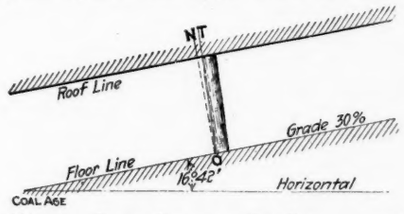
## Setting Post Timber in an Inclined Seam

How much pitch should be given to a post in a seam having an inclination of 18 deg.? Explain the manner of setting a post in an inclined seam. What is the purpose of the cap-piece above the post?

A Miner.

Crosby, Wyo.

When setting a post in an inclined seam, the post must be *underset;* that is to say, it must be inclined up the pitch a slight angle from the normal, as shown in the accompanying figure. The angle *NOT* at which the post




Showing How a Post Should Be Set in an Inclined Seam

is inclined up the pitch, will vary from 1 to 9 deg., according to the amount of inclination of the seam. The purpose of undersetting a post, in an inclined seam, is to prevent its being loosened by the slipping of the roof downhill, as the coal is extracted. It is evident from the figure that any movement of the roof, in a direction down the pitch, will tend to tighten the post when it is thus underset.

When setting a post in an inclined seam, a slight foothold is first cut in the floor of the seam sufficient to hold the foot of the post in place while setting. The small end of the post is then placed over this foothold with the large end up the pitch. In this position, the head of the post is raised, the cap-piece being inserted between the top of the post and the roof. Both the head of the post and the cap are then driven forward from the upper side, until the post assumes its proper position.

The purpose of the cap-piece is twofold: First, the cap-piece serves to distribute the resistance of the post over a greater surface of the roof and tends to prevent the post from cutting into the roof as would otherwise often be the case. Second, the cap-piece should be of soft wood and of sufficient size to completely cover the head of the post. As the roof "weights," the head of the post is forced into the soft wood of the cap, which binds it together and prevents the "furring" of the post. By *furring* is meant the crushing over of the fibers, at the head of the post.

# EXAMINATION QUESTIONS

## Miscellaneous

*Answered by Request*

*Ques.*—What precaution would you take in a gaseous mine, where coal is cut by electric machines and what method of blasting the same would you adopt?

*Ans.*—The use of electric machines in gaseous mines is attended with danger and should only be permitted when the working face can be kept free from any accumulation of gas and an ample current of air continually sweeps the face of the coal. In a gaseous mine, it is better to use some other type of machine for undercutting the coal. If electric machines are used, every precaution must be taken to prevent sparking or short-circuiting of the electric current, as well as to maintain an ample ventilating current sufficient to carry off the gases as they are generated.

In blasting down the coal, after the face has been undercut, care should be taken to avoid heavy shots and to see that the coal is not cracked or broken in the vicinity of the shot. The fine machine cuttings must be cleaned up and removed and the place carefully tested for gas before a shot is fired. Permissible powder should be used in blasting. If the mine is dusty, the working face should be thoroughly sprinkled, and also the road and ribs for a distance of about 20 yd. from the face.

*Ques.*—Give the composition of monobel powder and state what gases are generated when this powder is exploded.

*Ans.*—Monobel is a permissible powder of the ammonium-nitrate class, containing nitroglycerin. The principal constituents of the powder are nitroglycerin, wood pulp, ammonium nitrate and moisture. The proportions of these constituents are such as to produce complete combustion. The gases produced are carbon dioxide, nitrogen and water vapor.

*Ques.*—At the same temperature and pressure, which is the heavier, dry air or the same volume of air fully saturated with moisture?

*Ans.*—At the same temperature and pressure, dry air is heavier than air saturated with moisture, volume for volume. The reason for this is that the water vapor or moisture occupying a portion of the space is lighter than the air that it displaces. The specific gravity of water vapor is 0.6235.

*Ques.*—(a) With a barometric pressure of 30 in. and a temperature of 60 deg. F., what effect would be produced on a given volume of air if the barometer should fall to 29.5 in.? (b) What change in temperature would be required to maintain a constant volume of air, under this fall of barometer?

*Ans.*—(a) For a constant temperature, the volume of air or gas varies inversely as the barometric pressure; in other words, the *volume* ratio is equal to the *inverse pressure ratio* or *barometer ratio.* For example,

$$\frac{V_2}{V_1} = \frac{B_1}{B_2} = \frac{30}{29.5} = 1.017, \text{ nearly}$$

Therefore, the temperature remaining the same, a fall of barometer from 30 to 29.5 in. expands the air volume 1.017 times; or, 10,000 cu.ft. of air would then become 10,170 cu.ft.

(b) For a constant volume, the absolute temperature varies as the barometer; or, in other words, the *absolute-temperature ratio* is equal to the *barometer ratio.* In this case, calling $x$ the temperature required to maintain the volume of air constant when the barometer falls from 30 to 29.5 in., we have

$$\frac{460 + x}{460 + 60}; \text{ or } \frac{460 + x}{520} = \frac{29.5}{30} = 0.9833$$

$$460 + x = 0.9833 \times 520 = 511.3$$

$$x = 511.3 - 460 = 51.3° \text{ F.}$$

Therefore, if the temperature falls from 60 to 51.3 deg. F, when the barometer falls from 30 to 29.5 in., the volume of air will remain unchanged.

*Ques.*—What determines the number of posts that must be set in a room 24 ft. wide?

*Ans.*—The number of posts that must be set at the face of a room will depend on the character of the roof and floor, the depth of the seam below the surface and, to some extent, on the thickness of the seam. Assuming a 5-ft. seam and timbers 5 ft. long and 5 in. in diameter at the small end, the end area of each post would be $0.7854 \times 5^2 = 19.635$ sq.in. Then, taking the safe crushing strength of the timber as, say, 3500 lb. per sq.in., and the load each post will carry without crushing is

$$\frac{19.635 \times 3500}{2000} = 34.36, \text{ say 35 tons}$$

Under a fair roof, the height of the loose material resting on the props may be taken as one-half of the width of the opening. Then taking the weight of the roof material as 160 lb. per cu.ft., the pressure per square foot resting on the props is

$$\frac{24 \times 160}{2} = 1920 \text{ lb., say 1 ton}$$

In this case, therefore, each post will safely support 35 sq.ft. of roof; or the posts may be set $\sqrt{35}$ = say, 6 ft. apart. This is what may be called the maximum distance apart of the posts, under the conditions assumed. With a frail roof, the timbers must be set closer together.

*Ques.*—Find the inclination of a seam of coal outcropping on a level surface. A vertical borehole is sunk at a point 500 ft. from the line of outcrop and penetrates the seam at a depth of 350 ft. below the surface.

*Ans.*—The tangent of the angle of inclination of the seam or the tangent of the angle the seam makes with the horizontal plane is equal to the depth of the hole divided by the horizontal distance from the bore hole to the outcrop of the seam as measured on the surface. Thus, in this case,

$$\tan A = \frac{350}{500} = 0.7$$

The angle of inclination, as found in the table of tangents is, therefore, 35 deg.

# COAL AND COKE NEWS

## Washington, D. C.

Investigations which have been ordered by the Interstate Commerce Commission during the past few weeks have developed, it is now understood, a condition which, it is believed, can be corrected only through a searching inquiry and orders issued as a result thereof. The case in question relates to the use of private cars in a way that tends to produce abuse and to give what amounts to rebates to those who are disposed to avail themselves of the opportunities in this regard that are offered under the situation said to be in existence today.

In order to get at the facts in the matter, inquiries have been sent out to a large number of concerns throughout the United States that the commission may ascertain, if possible, whether these concerns have shared in any degree in the supposed profits of the private car system. Among those who are understood to have made serious complaints to the commission within the recent past, are many coal-mine owners who assert that they have been unable to get the facilities they desire, and that, as a result, they have had to witness advantages given to others who are not especially entitled to them and whose preference over the complainants has resulted in decided damage to the latter.

The private-car question has formed the basis of a good many inquiries and hearings before the commission for some time past, and there has apparently been no way of correcting the abuses said to have sprung up, under existing laws. Mr. Marble, the newly appointed member of the commission, is particularly close to the private car situation, as he has devoted himself largely to the study of the conditions growing out of the widespread use of the cars in question.

Commissioner McCord has been given general authority over this investigation and has designated George P. Boyle as chief examiner to collect the information and direct the work of special examiners. In communicating with the public, the commission says officially: "It is the desire of the commission that all shippers or associations interested in this investigation communicate to it not later than Mar. 31 such information as may be in their possession and which they consider pertinent to the inquiry."

It is stated that in all probably about 1200 private car companies exist, and the series of questions has been mailed to them, preceded by a statement setting forth that it is the intention of the Commission to hold hearings at various places throughout the country and informing the recipients that the answers sent in will be used as the basis of the hearings.

It is believed that one important phase of the answers to the interrogatories will be found in the question whether in the judgment of the shippers and the car companies a carrier ought to own enough equipment to take care of all of the commodities of every kind originating on its line and which it is likely to be asked to handle.

Judging from present appearances, the investigation is likely to be protracted for a good many months. Much of it will probably be carried on in the mining regions.

### Proposed Rate Advances

Definite plans have been made, according to information received here by the domestic interests, to urge upon President Wilson's administration what is considered by railway men the necessity of an advance in the rates on bulk commodities generally and on coal and a few others in particular.

The roads are feeling keenly the movement for the increase of wages which, they assert, has put them in position to suffer severely unless they are enabled to raise their rates in a corresponding degree. Up to date, as is well known, the attitude of the Interstate Commerce Commission has been hostile to any advance in rates, and proposed increases have been almost uniformly turned down on the ground that they were not required and were not in harmony with the policy enunciated in the so called "advanced rate decisions" of a couple of years ago.

The action of the administration in appointing Franklin K. Lane as its Secretary of the Interior and in nominating John H. Marble, who has been in general sympathy with the policy of Mr. Lane as his successor, is not considered to show much sympathy with the plan to advance charges on the roads. Nevertheless, the railroad men are preparing to present their case in a strong and effective manner in order that Mr. Wilson himself may be persuaded to take a definite attitude regarding it.

It is felt that, while the powers of the administration with respect to rates are far smaller than they were at the opening of the Taft administration, owing to the transfer of so much power to the commission, the point of view of the President would be exceptionally influential with the commission as the policy to be followed on rates has always been considered a semipolitical, if not a wholly political, issue.

### PENNSYLVANIA

#### Anthracite

**Wilkes-Barre**—No. 4 colliery of the Kingston Coal Co. was totally destroyed by a fire which broke out in a tower over the engine house. The loss to the company will amount to $100,000, which is partially covered by insurance. More than 2000 men and boys will be thrown out of employment for a time at least. The cause of the fire is supposed to have been a crossed wire in the tower of the breaker.

**Hazleton**—The Government mine-rescue car which has been stationed at the collieries of the Hazleton district for the past seven weeks has been removed to Wilkes-Barre.

**Plymouth**—According to the decision of the officials of the Avondale colliery of the D., L. & W. Coal Co. that colliery will probably be closed down for some time. The company is having trouble with its men over the prices paid for setting timber.

#### Bituminous

**Adrian**—The large company store of the Jefferson & Clearfield Co. has been totally destroyed by fire. The building was a three-story structure, with a warehouse annex.

**Harrisburg**—Governor Tener has named the members of the mine-examining board for the bituminous district for the next four years. The board consists of A. W. Callaway, Indiana; Robert Morris, Greensburg; H. C. Drum, Coal Center; R. M. Pollock, Star Junction, and C. B. Maxwell, Morrisdale. All appointments have been confirmed.

**California**—William Matthews and son were seriously injured by a fall of slate in the Vesta Coal Co.'s mine at California.

**Altoona**—Mine-rescue car No. 6, in charge of Mine Foreman D. D. Davis, has left Cardiff and is now located at Vintondale.

**Du Bois**—Superintendent John H. Fulford, of the Eriton shaft, announced, Mar. 6, that that operation would close down for the purpose of repairing the pan on the tipple.

Mr. Fulford stated that it would require three weeks to repair the work, and that the mines would be idle all of that time. He stated that in the 40 hours that have been worked at the shaft since the men resumed work under the new system, the company has lost 257 tons of coal, which is the chief cause for stopping work at this time.

It is planned to raise the rear of the pan so that it will clean itself.

### WEST VIRGINIA

**Wheeling**—Seventy-five miners at the mine of the Fairpoint Coal & Coke Co. are out on strike. Subdistrict officials are investigating the trouble with a view to an early settlement.

**Moundsville**—The jury has granted a judgment of $6000 in favor of the widow of one of the eight men who lost their lives in the Panama disaster last July. This case is the first of the eight to be tried. Incompetency on the part of the fireboss was alleged.

### INDIANA

**Princeton**—The Jackson coal mine at Fort Branch has been closed down by the state inspectors. The inspectors insist that black powder shall not be used in the mine, while the company declares they see no reason for a change, since the mining law does not prohibit it. The trouble is the outcome of a recent accident in which two shotfirers were killed and the mine partly wrecked. It is probable that the owners

of the mine will bring action to restrain the state mine inspector from enforcing this order.

**KANSAS**

**Pittsburg**—Two hundred miners employed at the mine No. 14 of the Fleming Coal Co. have been ordered to remove their coal and tools from the mine by the district mine officials. The men say they quit work because the operators refused to raise the wages of the mine motormen according to an alleged agreement.

Coal has been struck in Grant Township on the land which has been optioned by the Misouri, Kansas & Texas Ry. Co. The seam is 10 in. thick and lies at a depth of 84 ft.

**NORTH DAKOTA**

**Makoti**—A 6-ft. bed of high-grade coal is said to have been discovered on the B. Rosenberg farm by well diggers. It is believed that the fuel is of the highest quality ever found in the state. It is extremely hard and apparently not of the ordinary lignite type.

## FOREIGN NEWS

**Hobart, Tasmania**—The bodies of 18 miners were brought to the surface of the North Mount Lyell mine Mar. 1, after a search which has lasted nearly five months. Forty-five bodies have now been recovered, and a further search has been abandoned. A fierce fire, started by the explosion in which the men were killed last October, has made it unsafe to explore the mine further.

## PERSONALS

F. R. Lyon has been appointed general manager of the Consolidation Coal Co. Mr. Lyon will be in charge of the operations in all the coalfields of the company.

Daniel C. McAlpine, formerly superintendent for the Brewer Coal Co., at Brewer, Okla., has taken the position of superintendent for the Folson Morris Coal Co., at Lehigh, Okla.

John Markle, for over thirty years a prominent factor in the anthracite mining industry, is about to retire to private life, and his brother, Alvin Markle, will assume charge of the Markle mining interests on Apr. 1.

H. M. Wilson, engineer in charge of the government experiment station at Pittsburgh, has been made chairman of the executive committee of the American Mine Safety Association. This organization has been formed to work for a reduction in the number of deaths in the mines and quarries through the country.

Fred R. W. Thomas, formerly superintendent of mines for the Northern Pacific Ry. Co., at Roslyn and Cle-Elum, Wash., was recently promoted to take charge of the company's mines in King County, where the mining conditions are much more complex. His headquarters are at Ravensdale on the main line of the Northern Pacific, about 30 miles from Seattle.

Herman Bacharach, until recently located at 722 Lewis Block, Pittsburgh, Penn., has moved into larger quarters at 1009 Hartje Building. He has enlarged the number of his specialties in scientific and industrial instruments. Besides indicating and recording steam and gas apparatus, he has taken up some new lines of instruments. Among others, smoke and dust recorders, specific gravity meters for gas and liquid. carbon dioxide recorders and engine indicators with automatic efficiency reckoner, etc.

## RECENT COAL AND COKE PATENTS

**Ore Dock.** M. Toltz, St. Paul, Minn. 1,050,357, Jan. 14, 1913. Filed Apr. 21, 1911. Serial No. 622,498.

**Conveyer.** C. W. Hunt, New York, N. Y. 1,048,834, Dec. 31, 1912. Filed Dec. 30, 1910. Serial No. 600,007.

**Stoker.** D. F. Crawford, Pittsburgh, Penn. 1,050,054, Jan. 7, 1913. Filed May 8, 1909. Serial No. 494,894.

**Coal Chute.** F. H. Dudley, Lincoln, Neb. 1,049,464, Jan. 7, 1913. Filed July 15, 1912. Serial No. 709,610.

**Miner's Squib.** J. R. Powell. Plymouth, Penn. 1,050,390, Jan. 14, 1913. Filed Mar. 7, 1912. Serial No. 682,154.

**Coal Drill.** W. H. Clarkson, Edwards Station, Ill. 1,049,454, Jan. 7, 1913. Filed Mar. 16, 1908. Serial No. 421,342.

**Centrifugal Pump.** R. H. Dixon, Newark, N. J. 1,050,523, Jan. 14, 1913. Filed Dec. 20, 1911. Serial No. 666,977

**Mechanical Stoker.** D. F. Hervey, Logansport, Ind. 1,049,357, Jan. 7, 1913. Filed Mar. 25, 1912. Serial No. 686,185.

**Furnace Grate.** T. Dawson, Livingston Manor, N. Y. 1,050,619, Jan. 14, 1913. Filed Dec. 12, 1911. Serial No. 665,290.

**System of Handling Coal.** W. E. Hamilton, Columbus, Ohio. 1,050,272, Jan. 14, 1913. Filed Nov. 27, 1911. Serial No. 662,639.

**Mechanical Stoker.** W. Seaton, Jr., New York, N. Y. 1,048,356, Dec. 24, 1912. Filed June 27, 1905. Serial No. 267,174.

**Exhaust Valve for Steam Engines.** H. O. Hem, Kansas City, Mo. 1,050,537, Jan. 14, 1913. Filed Feb. 12, 1912. Serial No. 677,153.

**Valve Gear for Steam Engines.** J. Davidson, Pendleton, Eng. 1,050,618, Jan. 14, 1913. Filed May 20, 1911. Serial No. 628,372.

**Coke Oven Door.** T. J. Mitchell & J. A. McCreary. Uniontown, Penn. 1,050,677, Jan. 14, 1913. Filed July 18, 1911. Serial No. 710,304.

**Device for Propping Mines.** F. Nellen. Essen-on-the-Ruhr, Germany. 1,049,135, Dec. 31, 1912. Filed July 29, 1908. Serial No. 445,964.

**Handle Fastening for Picks and Other Tools.** E. L. Ray, Agency, Iowa. 1,048,096, Dec. 24, 1912. Filed Mar. 12, 1912. Serial No. 683,281.

**System of Feeding Treated Water to Boilers.** J. H. Cooper, Paola, Kan. 1,050,616, Jan. 14, 1913. Filed Mar. 13, 1911. Serial No. 614,198.

**Centrifugal Pump.** J. A. Yeatman, assignor to United Iron Works, Oakland, Calif. 1,050,588, Jan. 14, 1913. Filed Dec. 26, 1911. Serial No. 667,758.

**Valve Gear.** T. Hall, assignor to Ridgway Dynamo & Engine Co., Ridgway, Penn. 1,050,213, Jan. 14, 1913. Filed Dec. 8, 1912. Serial No. 531,938.

**Gas Producer.** W. B. Chapman, assignor to Chapman Engineering Co., New York, N. Y. 1,049,994, Jan. 7, 1913. Filed Mar. 5, 1910. Serial No. 547,514.

**Stoker.** H. E. Stover, assignor to Baldwin Locomotive Works, Philadelphia, Penn. 1,048,756, Dec. 31, 1912. Filed May 21, 1912. Serial No. 698,680.

**System for Utilizing Waste Heat** from Furnaces for Heating Boilers. J. W. and Herman Hegeler, Danville, Ill. 1,050,134, Jan. 14, 1913. Filed Jan. 25, 1912. Serial No. 673,428.

**Apparatus for Watering Coke in Coke Ovens.** C. E. Taylor, Pittsburgh, Penn., and A. C. Wolfe, Alicia, Penn. 1,049,006, Dec. 31, 1912. Filed Oct. 11, 1911. Serial No. 654,152.

**Coke Oven Steam Generator.** J. H. Morgan, assignor to Titlow Waste Heat Power Co., Uniontown, Penn. 1,050,679, Jan. 14, 1913. Filed July 28, 1909. Serial No. 510,091.

**Apparatus for Removing Ashes from Gas Producers.** W. H. Bradley, assignor to Duff Patents Co., Pittsburgh, Penn. 1,049,561, Jan. 7, 1913. Filed Feb. 8, 1912. Serial No. 676,461.

**Endless Movable Grate for Furnaces.** F. Girtanner, assignor to Laclede-Christy Clay Products Co., St. Louis, Mo. 1,050,531, Jan. 14, 1913. Filed July 8, 1911. Serial No. 637,464.

**Shield for Detonators** which are used in Shot-firing in Mines of all kinds and in Quarries. A. Price and W. Pryse, both of Treorky, Pontypridd, Eng. 1,049,143, Dec. 31, 1912. Filed Dec. 12, 1911. Serial No. 665,343.

## CONSTRUCTION NEWS

**Scalp Level, Penn.**—The Scalp Level Coal Mining Co. is erecting an extensive tipple east of Rummel.

**Tamaqua, Penn.**—Work on a shaft to be 750 ft. deep and requiring one year's time to complete was started recently by the Lehigh Coal & Navigation Co. at No. 11 colliery.

**Shenandoah, Penn.**—Work was commenced Mar. 1, on the construction of a colliery to prepare for market the coal which will be mined from the recently discovered coal beds in Locust Mountain.

**Wheeling, W. Va.**—Work has been started on general repairs of the machinery which operates the cables at the Big Bull coal mine. A new 450-hp. boiler is being installed and the work will be completed about the middle of the week.

**Baltimore, Md.**—The Alabama & New Orleans Transporta-

tion Co. is having built at its shipyard 16 self-propelling barges of 1000 tons each, to cost altogether $416,000. One barge is ready for launching and the others will be ready at the rate of about one every six weeks.

**Little Rock, Ark.**—Electric mining machines have been installed in Central Mine No. 4 and are declared to be an unqualified success. It is said by their use the output of coal is made 80 per cent. lump and the quantity of explosives used and the danger therefrom is reduced one half.

**Ashland, Penn.**—The G. B. Markle Co. is completing a fine wash house for the employees at No. 5 Highland, which will be ready for use in a few days. The building was formerly the old elctric-light station, the interior of which has been remodeled and fitted with all modern conveniences.

**Connellsville, Penn.**—Charles Pore and H. N. Odbert, of Monessen, said to represent Pittsburgh and Charleroi capitalists, are putting a force of men to work opening a mine to develop a tract of 540 acres of coal at Rogers Mill, in the Indian Creek valley. It is reported a coke plant will be constructed.

**Fairpoint, Ohio**—The Provident Coal Co. is planning to construct another mammoth reservoir which will furnish water for the use of the new mine of the company at Fairpoint. It is not known whether the reservoir will be constructed this year or not. The cost of construction is estimated at about $30,000.

**Peoria, Ill.**—The Newsam Bros. are sinking a shaft on the Frank Bateman farm, one mile south of Glasford. They expect to have a greater output of coal than that afforded by their mine at Kingston, and hope to be able to hoist coal by the latter part of the summer. One hundred and seventy-five men will be employed.

**Huntington, W. Va.**—Thirty miles of railroad is to be built by the Chesapeake & Ohio Ry. Co., near Beaver Creek, Ky. The work will be begun Apr. 1. A number of capitalists owning valuable coal and timber lands adjacent to the Beaver Creek territory, are preparing to begin work at once on building tipples and locating mine openings.

**Scranton, Penn.**—It is estimated that the Laurel line will be able to reclaim approximately from fifteen to twenty thousand tons of coal out of the basin of the old Roaring Brook boom that it owns along its right-of-way and preparations have been made to double the capacity of its pumping plant. The addition to the plant will probably commence operations Apr. 1.

**Pottsville, Penn.**—The Reading Co. is developing plans for greatly adding to the output of coal within the next few years. Many new openings will be made. The largest proposition which is now in hand is the sinking of a four-compartment shaft at the Reliance Colliery at Beaverdale. This will probably be dropped to a depth of 620 ft.

**Pittsburgh, Penn.**—The Pennsylvania R.R. is arranging to enlarge the coaling stations along its lines, especially at larger terminals. In the improvement contemplated the Pennsylvania will probably carry out the new plan adopted by the Wabash. This road has erected at different points along its territory modern steel structures, which store about 300,000 tons of coal, which are arranged so that they can deliver the coal to the engine either on the main tract or on passing tracts.

**Brownsville, Penn.**—The plant of the Luzerne Coke & Coal Co. is expected to be in operation by May 1. When completed it will consist of 35 ovens and in addition it is expected to mine about 400 tons of coal per day for shipment. The Belle Vernon plant is now in full operation with a battery of 32 ovens. The W. Moreland Co. plant of the concern, heretofore known as the Marion Coke & Coal Co., has increased in size by 40 ovens.

## NEW INCORPORATIONS

**McKeesport, Penn.**—The Meyers Coal Co.; capital stock, $5000.

**Pineville, Ky.**—The Pineville Coal Mining Co. ;to develop coal land; capital stock, $50,000.

**Harrisburg, Penn.**—The Hudson Coal Co. has increased its capital stock from $2,500,000 to $3,500,000.

**Harrisburg, Penn.**—The Locust Mountain Coal Co. has increased its capital stock from $10,000 to $350,000.

**Dallas, Tex.**—The McKay Lignite Mining Co.; capital stock, $7500. Incorporators: J. C. McKay, H. C. McKay and F. R. McKay.

**Bartlesville, Tex.**—The Interstate Oil & Gas Co.; capital stock, $100,000. ncorporators: A. H. Garges, John Melcher, C. S. Whitlow.

**Charleston, W. Va.**—The Claybrook Coal Mining Co.; to mine coal; capital stock, $100,000. Incorporators: J. E. Chilton, S. Hess and T. S. Clark.

**Hamilton, Mont.**—The Darby Coal Mining Co.; to engage in mining. Incorporators: R. B. Nicholson, D. D. Nicholson, Thomas Padden and W. R. Gibford.

**Little Rock, Ark.**—A number of Pine Bluff capitalists have organized a company for developing the coal and clay resources of the county; capital stock, $1,000,000.

**Wheeling, W. Va.**—The Warewood Coal Co.; to mine coal; capital stock, $25,000. Incorporators: Johnson C. McKinley, Harry D. Wells, M. B. Marther and John C. Beury.

**Louisville, Ky.**—The Tennessee Jellico Coal Corporation has increased its capital stock from $300,000 to $400,000 for the purpose of developing a large tract of coal land at Hazard, Ky.

**Chicago, Ill.**—The Harkes Coal Co.; to mine and sell coal and clay and their products; capital stock, $6000. Incorporators: Arthur Conno, Thomas J. Dunney and Christopher Whalen.

**East St. Louis, Ill.**—The Southern Coal, Coke & Mining Co.; to mine coal and manufacture coke; capital stock, $1,000,000. Incorporators: W. K. Kavanaugh, James Y. Lockwood and John B. Kennard.

**Kingston, N. Y.**—The Silver Bell Mining Co.; acquire mining rights of all kinds and to develop mineral lands; capital stock, $1,000,000. Incorporators: Walter H. Clark, John M. Lester, Guillermo M. Bingham.

**Cumberland, Md.**—The Proctor Slate Mfg. Co.; to quarry and mine for slate and all byproducts; capital stock, $1,200,000. Incorporators: Theodore Thimmel, G. Harry Bevard, M. C. Alwine Roberts, H. Rea Engle, D. H. Silver and W. J. Maloney.

## INDUSTRIAL NEWS

**Canton, Ill.**—Star Mine No. 2 has shut down indefinitely owing to the poor market for coal.

**Lethbridge, Alta.**—The city contemplates purchase of 240 additional acres for an industrial site and another municipal coal mine.

**Hickton Station, Penn.**—J. H. Sanford Coal Co. will soon install a 13-ton electric mining locomotive recently ordered from the General Electric Co.

**Pottsville, Penn.**—The Gilberton colliery has resumed operations. The colliery has been idle since Feb. 25, when the waters of Mahanoy Creek broke into the workings.

**Johnson City, Tenn.**—The auditor's department of the Clinchfield Coal Corporation has been removed to Dante, Va., where the mines and headquarters of the company are located.

**Pittsburgh, Penn.**—Reports are heard of the formation of a company whose purpose will be to install retort coke ovens in the region surrounding Oakmont, to utilize the coal of the twin Freeport seams.

**Georgetown, Ill.**—The Bunsen Coal Co. will place a 13-ton electric locomotive in service in connection with its colliery at Georgetown. The order for the machine has been placed with the General Electric Co.

**Pittsburgh, Penn.**—The Pittsburgh Coal Co. will shortly install in its power plants, nineteen 150-kw., two-unit, three-bearing, synchronous motor-generator sets recently ordered from the General Electric Co.

**Pottsville, Penn.**—The anthracite region is again handicapped by a shortage of cars. So pronounced is this deficiency that collieries in the Shenandoah district have reduced their working day to seven hours.

**Fairmont, W. Va.**—The Consolidation Coal Co. will add to the equipment of its mines at Jenkins, Ky., four 10-ton and four 6-ton electric mining locomotives. The machines have been ordered from the General Electric Co.

**Carrolltown, Penn.**—No. 33 Mine, the biggest of the Pennsylvania Coal & Coke Corporation, at Patton, was closed on Wednesday of last week, because, it is said, of a fault in the coal. Between 300 and 400 men were employed there.

**Ashland, Penn.**—The Midvalley collieries Nos. 1 and 2 of the Midvalley Coal Co. are tied up by a strike which was caused by the alleged refusal of the company to discharge nonunion workmen. About 900 men and boys are idle.

**Green Bay, Wis.**—The C. Reiss Coal Co. closed a deal by which it becomes owner of the Waukegan Coal & Dock Co., at Waukegan, Ill. The new property has the capacity of 150,000 tons of coal, and is equipped with three loading towers.

**Scranton, Penn.**—The Reading company is developing plans which will add greatly to its output of coal within the next few years. The contemplated improvements consist of many new openings, besides the breaking in of a tract of virgin territory.

**Russelville, Ark.**—The store at the Russelville anthracite mines, which has been closed since the mines shut down two years ago, is to be reopened. The mining property is being put in shape for operation again, and will start work early in March.

**Greensburg, Penn.**—Rockwell Marietta, of Connellsville, purchased for the Marietta-Connellsville Coke Co. 225 acres of coal land in the Ligonier Valley from Judge John B. Steele, of Greensburg. The consideration was in the neighborhood of $200 per acre.

**McAlester, Okla.**—Osage mine No. 8 at Krebs and No. 7 at Richville have been shut down by the operators, and the miners have removed their tools from the pit. The mild weather has caused a falling off of orders, which has resulted in the shutdown.

**Wilkes-Barre, Penn.**—The Lehigh Valley Coal Co. is pumping the water out of the old Tomhicken Colliery, which has been idle for years. The company intends to retimber the workings and resume operations, as considerable unmined coal remains in the colliery.

**Birmingham, Ala.**—The Maryland Coal & Coke Co. will equip its plant at Sipsey, Ala., with two 150-kw. generators, 18 motors, ranging from 6.75 to 40 hp., switchboard and three 7-ton electric locomotives. All the equipment will be supplied by the General Electric Co.

**Philadelphia, Penn.**—The Berwind-White Coal Mining Co. will add to the electrical equipment in its collieries at Windber, Penn., a 400-hp. two-unit two-bearing motor frequency changer set and switchboard apparatus, which has been ordered from the General Electric Co.

**Du Pont, Ill.**—It is generally understood that the new Du Pont Coal Co. will combine the Central Coal & Iron Co., Caldwell Coal Co., Duncan Coal Co., Wickliffe Coal Co., Broadway Coal Co., and others on the Illinois Central and Louisville & Nashville railways in Kentucky.

**Scranton, Penn.**—Five collieries have been shut down temporarily by the Delaware, Lackawanna & Western R.R. Co. These are the Sloan and Central shafts of the Avondale, the Dodge, the Diamond and the Pyne. It is understood that operations have been discontinued because of the need for repairs.

**Big Stone Gap, Va.**—The Stonega Coke & Coal Co. is arranging to install a 200-kw. generator and switchboard in its power plant, and will add to its mine equipment six 4-ton and two 13-ton electric mining locomotives. The order for all this new apparatus has been placed with the General Electric Co.

**Russelville, Ark.**—The Southern Anthracite Coal Co. mines closed the season's run Saturday, and will shut down for a short time to make necessary repairs and clean up for the coming season. It is reported that the mines will start again not later than Mar. 15. They have had practically a 12-months' run.

**Connellsville, Penn.**—The No. 4 mine of the Vesta Coal Co., a subsidiary of the Jones & Laughlin Steel Co., has during the past 10½ years produced 13,337,599 tons of coal. The mine employs 1050 men inside. The property originally covered four square miles. The mined-out area would make a tunnel 6 ft. wide and 1263 miles long.

**Connellsville, Penn.**—Further development of the Indian Creek valley coal field is to be undertaken shortly near Rogers Mill. Preparations are under way for opening a mine on a tract of 540 acres. Charles Pore, of Monessen, who, with H. N. Odbert, of that place some time ago purchased the tract, is on the ground employing men for the initial work.

**Bluefield, W. Va.**—The U. S. Coal & Coke Co. has inaugurated an educational department for its employees. The principal subjects treated in the instruction are arithmetic and the properties of gases. So far there has been considerable interest manifested by the employees, and it is understood that the meetings are largely attended. The school is open to all.

**New Bethlehem, Penn.**—It is rumored that the Pennsylvania R.R. has an option on the Buffalo & Susquehanna R.R., and that there is a probability of its taking that road over in the near future. The B. & S. road has been in the hands of a receiver for several years. The purpose of its construction was to tap some of the best mining territory in the soft-coal region.

**Charleston, S. C.**—The action of the directors of the Carolina, Clinchfield & Ohio in approving plans for the construction of large coal piers at Charleston has been warmly indorsed by business interests. By improved machinery, vessels of 8000 tons will be loaded with coal in four or five hours. Much double-tracking has been done over the Coast Line road entering Charleston.

**Morgantown, W. Va.**—A deal for the sale of 500 acres of coal in Union district was consummated Mar. 2. The sale included two tracts, one of 201 acres, the other of 250 acres. The surface and the Pittsburg, Sewickley, and other beds of coal were sold to W. H. Seymour, of Pittsburgh. The price was $300 an acre. It is said that the purchaser expects to develop it without delay.

**Columbus, Ohio**—Attorney E. D. Howard is negotiating for a tract of 12,000 acres of coal land in Lawrence County for interests here. A 30-day option on the tract known as the McGugin coal and iron fields has been authorized by Judge Corn. The price mentioned in the option is $200,000. It is understood that a new mining company is to be organized here to operate the property.

**Terre Haute, Ind.**—The Grant Coal Mining Co. of Vigo County executed to the Continental & Commercial Trust & Savings Bank, of Chicago, Ill., a mortgage on its holdings in this county for $100,000, to cover a bond issue of 100 gold bonds of the par value of $1000 each. The bonds are to bring 6 per cent. interest, and the money so realized is to be used in improving the property of the company.

**Hutchinson, Kan.**—The Columbus Coal Co. has leased about 800 acres southwest and west of here, with the guarantee that work will begin on prospecting within 90 days, and that if coal is found, that shafts will be sunk at once. That the fuel will be discovered in paying quantities is almost a foregone conclusion as prospects were made there several years ago, and it was declared then that good deposits existed.

**Grafton, W. Va.**—Unless unforeseen difficulties arise it is practically certain that the coal holdings of Col. J. M. Guffey will soon be taken up by the Morgan interests. The tract lies in Preston, Barbour and Taylor Counties, and comprises something like 100,000 acres. The price is said to exceed $100 an acre. It is understood that the deal will be closed in anticipation that the New York Central will push the completion of its line from Fairmont to Belington.

**Red Bank, Penn.**—In a few days active work will start on the Pennsylvania R.R. tunnel at the junction of Red Bank Creek and the Allegheny River. This tunnel cuts off several miles of a bend, and was to have been constructed many decades ago, when the road was built. East Brady parties, however, paid part of the construction cost of diverting the railroad several miles. The tunnel is half a mile through and will save several miles between Pittsburgh and Buffalo.

**Scranton, Penn.**—Producing a million tons of coal without a fatal accident is the record to which the Lackawanna coal officials are pointing on behalf of the National Colliery, at Scranton. The last fatal accident at this place was in the fall of 1910. The inside foreman at the National is John Owens, and the outside foreman is Fred Peters. The Manville Colliery, of the same company, has had a perfect record for the past two years, but is not so large a colliery as the National.

**Pottsville, Penn.**—The increase of the capital stock of the Delaware & Hudson Coal Co. from $2,500,000 to $3,500,000, and the increase of capital stock of the Locust Mountain Coal Co. from $10,000 to $550,000, are indications that the former company will develop the coal lands in Schuylkill Valley soon. The Locust Mountain Co. came into possession recently of rich coal lands north of Shenandoah belonging to the Girard estate, which will be opened during the year and great producing facilities will be established.

**Pottsville, Penn.**—The Philadelphia & Reading Coal & Iron Co. has arranged for installing considerable electrical equipment, consisting of a 150-kw., two-unit, three-bearing, motor-generator set, switchboard, and an 8-ton, 48-in. gage electric mining locomotive in the Suffolk Colliery near St. Nicholas, Penn.; a 600-kv.a. generator with 30-kw. exciter, 20-kw. motor-generator set and switchboards in the Bear Valley Colliery, near Shamokin, Penn.; a 600-kv.a. generator with 30-kw. exciter and switchboard in the Locust Gap Colliery; a 100-hp. induction motor and controller in the Mahanoy Colliery; a 600-kv.a. generator with 30-kw. exciter and switchboard in the Pine Knob Colliery, near Minesville, Penn.; and a 375 kv.a. generator, 20-kw. exciter and switchboard in the Silver Creek Colliery near Pigila, Penn. All this various apparatus has been recently ordered from the General Electric Co.

# COAL TRADE REVIEWS

## GENERAL REVIEW

Orders for hard coal are so scarce that companies have finally been forced to curtail production. Such a condition at this period of the year has never been known to exist in the recent history of the industry, and it is even more remarkable in view of the fact that there was a shortage of over 6,000,000 tons in last year's production. The individuals are making every effort to sell at the April discount, but with only indifferent success. The movement now is restricted almost entirely to the steam grades, in which there is some little activity particularly on pea, which is the strongest of any size. Indications are that considerable winter coal will be carried over into April, and there is not a very favorable feeling over the outlook for that month.

The attempt of the Eastern bituminous operators to gain some control over the market is apparently meeting with partial success. It is obvious that production is being restricted, while accumulations are slowly disappearing, and if this continues the weak points in the market will be eliminated shortly. The movement is light, although steady, and only on specific orders, while the general tone is firmer and concessions less frequent. It is noticeable that contracts for the new year are generally for a larger tonnage.

Shipments in the Pittsburgh district are almost entirely on contract, but are quite heavy. It is evident that the consumers are accumulating as much of a surplus as possible before the higher contract prices go into effect. The market is not particularly good, and operators are now looking forward to the opening of navigation on the Lakes, which will be somewhat earlier than usual according to present indications. In Buffalo and vicinity the railroads have not yet caught up, and there is considerable coal on track. Some colder weather caused a slight temporary increase in the demand, but dealers generally are well stocked and new sales are limited.

There has been a small increase in the demand in Ohio, as the result of the colder weather, but the trade is by no means active; however, this change in conditions served to check the rapid decline. Operations are fairly good ,contracts are being closed, at a slight advance, and the producers are looking forward to a heavy Lake business. The smokeless operators in the West Virginia fields are said to have agreed to suspend operations for one week, in order to work off surplus tonnages; dumping at the piers continues relatively slow. There have been some vigorous protests at the advance in retail prices in the Southern market, but the trade has been active as a result of the recent cold snap.

There are no new features in the Middle Western market, and operators are concentrating their attention on the new contracts. There has been a curtailment of shipments in Chicago, which has resuted in an increased demand, but dealers are holding off buying, believing they have enough to carry them over into the summer. The St. Louis trade is still badly demoralized, and some operators are going into bankruptcy.

## BOSTON, MASS.

There is a firmer tone to Pocahontas and New River. Most of the agencies are holding to the $2.85 price and concessions are less frequent. The accumulation at the Hampton Roads piers seems materially reduced and delivered prices at this end are up somewhat from a week ago. It is early for any restriction to be effective but if that said to have been determined upon last week, is carried out it is likely that soft places will disappear for the next month or two. That prices will be firm throughout the summer at a range from 15@35c. higher than last year seems too much to expect. Coal is to plentiful and there are too many shippers to permit such a general advance in an off year; $2.70 is still more nearly the actual price for spot coal.

Georges Creek is in rather short supply and orders have to be taken up in turn. The price for next season has not yet been announced but it is likely the f.o.b. basis at Baltimore will closely follow the Hampton Roads price. The Pennsylvania grades continue on about the same range. Clearfields are in light demand and, with other grades, are coming down only on orders. Prices are still from 5@10c. higher than the summer basis last year.

The all-rail movement is fairly steady but with only a light volume of coal running. Contract business is being closed slowly; buyers generally are showing only a lukewarm interest. Water freights are firm at 95c.@$1 for large vessels, Hampton Roads to Boston. Tonnage is in fair demand.

Anthracite is marking time, pending the first of April. Orders are being filed for spring shipment and a normal season is looked for. March so far has been good for coal-burning and stocks are going to be low when April shipments start coming in. Representatives of the independent operators are making desperate efforts to move March coal at April prices but so far they have had little success. Shipments for March are confined almost entirely to sizes like pea and broken on which the price does not change. There was some apprehension over spring orders calling for large proportions of stove but they turn out to be well assorted as to sizes.

Current wholesale prices are about as follows:

| | |
|---|---|
| Clearfields, f.o.b. mine | $1.25@ 1.50 |
| Clearfields, f.o.b. Philadelphia | 2.50@ 2.75 |
| Clearfields, f.o.b. New York | 2.80@ 3.10 |
| Cambrias, Somersets, f.o.b. mines | 1.30@ 1.60 |
| Cambrias, Somersets, f.o.b. Philadelphia | 2.55@ 2.85 |
| Pocahontas, New River, f.o.b. Hampton Roads | 2.70@ 2.85 |
| Pocahontas, New River, on cars Boston | 3.85@ 4.00 |
| Pocahontas, New River, on cars Providence | 3.75@ 3.85 |

## NEW YORK

**Bituminous**—The soft-coal market is comparatively firm on the better grades, which are in sufficient demand to make it necessary for consumers to await their turn in having orders filled. The off-grades are not so active, and as a rule are rather hard to move. There is still little or nothing doing in contracting, and operators are not showing any disposition to recede from their avowed intention of obtaining higher prices for the new year's business. The demand on current contracts is quite heavy, it being evident that consumers intend taking all the tonnage they can accommodate before these expire.

Stocks of soft coal at tide are about normal. Mines as a rule are working fairly good, and while there has been a slight shortage of equipment on the Pennsylvania R.R., the New York Central has been furnishing a full supply. Quotations are probably somewhat easier, and small lots of the lower grades can no doubt be picked up at less than $2.60. However, operators continue holding the nominal market at last week's level as follows: West Virginia steam, $2.60@2.65; fair grades, Pennsylvanias, $2.65@2.70; good grades of Pennsylvanias, $2.75@2.80; best Miller, Pennsylvania, $3.05@3.15; Georges Creek, $3.25@3.30.

**Anthracite**—The condition of the hard-coal market is such that nearly all companies have been forced to suspend operations because of the insufficiency of orders. This is probably the first time in the recent history of the industry that the operators have been forced to restrict their output so early in the season; it is a rather remarkable condition in view of the fact that production last year was over six million tons less than in 1911.

Of course, grades of all kinds are now accumulating in storage with the exception of the steam sizes, which still continue in fairly good demand, particularly pea, which is the strongest grade in the market. The large companies are still adhering rigidly to their circular, but individuals are readily quoting at the April discount, and even lower; individuals are also being forced to close down, and they are not making any further shipments on consignment. There is a feeling on the part of some of the conservative members of the trade, that if there is not a better buying movement, and a more pronounced disposition on the part of the consumers to stock, conditions this year will be a repetition of last year.

The market has shown slight fluctuations during the week, and is now quotable on about the following basis:

| | | Individual | |
|---|---|---|---|
| | Circular | Lehigh | Scranton |
| Broken | $5.00 | $4.50 @ $4.75 | $4.50 @ $4.75 |
| Egg | 5.25 | 4.55 @ 5.20 | 4.60 @ 5.25 |
| Stove | 5.25 | 4.95 @ 5.20 | 4.95 @ 5.25 |
| Chestnut | 5.50 | 4.70 @ 5.45 | 5.00 @ 5.50 |
| Pea | 3.50 | 3.45 @ 3.55 | 3.50 @ 3.60 |
| Buckwheat | 2.75 | 2.00 @ 2.45 | 2.50 @ 2.75 |
| Rice | 2.25 | 1.80 @ 1.95 | 2.25 @ 2.35 |
| Barley | 1.75 | 1.25 @ 1.70 | 1.55 @ 1.80 |

### PHILADELPHIA, PENN.

The element of curtailment has been introduced into the anthracite coal situation and the time has passed when the current output can be disposed of at the ruling circular prices; this does not refer to the quotations made by the individuals, which are hard to keep track of during the present period of inactivity. Half time is now the rule with many of the important companies, and a large proportion of the coal mined is going into stock.

The retail trade is in no sense active. The occasional cold snaps cause a monetary liveliness, but stagnation is likely to mark this branch of the trade until Apr. 1. There is no report of any of the dealers reducing their prices, which might be possible, considering that many of them are taking advantage of the low offerings by the individual operators. Perhaps they regard this as a recompense for some of the premium coal bought during the strenuous times a couple of months ago.

Stocks are not dwindling to the extent that the dealers would like, and if the present weather conditions continue, there are good prospects that some of them will carry over considerable coal into April, for which they have paid top-notch prices. Some of them are even complaining of premium coal still on hands, and their only salvation is to secure bargain coal now to mix with it, and get out with as little loss as possible. As a matter of fact, there does not seem to be an altogether favorable feeling as regards April business.

The bituminous market seems to have reached a process of elimination. Good coals are being offered at low prices, and as a consequence, inferior grades cannot find any outlet at all. Everything seems to be uncertain, and while contracts are being talked over, nothing definite seems to take place. Buyers are prospecting, looking to get the best for their money, and shippers indicate that they will expect anywhere from 10c. to 15c. advance over the figures prevailing last year.

### PITTSBURGH, PENN.

**Bituminous**—Mines are running at slightly greater output than formerly, and shipments are heavy, with a good car supply. There has been no difficulty as to the labor supply for some time. Operators notice a strong tendency on the part of many consumers having contracts expiring Apr. 1, to take extra tonnages at this time in order to create a surplus, in view of the fact that prices are on a higher level than those of expiring contracts. While it is claimed efforts are being made to prevent such accumulations, and to restrict shipments to actual needs, it is doubtful whether these efforts are made with any energy. The market has not been particularly good and the average operator is probably satisfied to obtain shipping instructions, irrespective of whether or not the consumer is trying to "beat the market." Prompt coal is bringing approximately contract prices, with slack at $1@1.05, or a premium of 10 to 15c. a ton. Regular prices remain: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.55, per ton at mine, Pittsburgh district.

**Connellsville Coke**—The market has been dull as to both prompt and contract. Strictly standard grades of coke are well held, but grades slightly off in sulphur or ash are offered at concessions, down to $2.15 or $2.20 for prompt furnace, such coke being better than much that was freely taken during the famine which suddenly terminated nearly two months ago. There have been no serious negotiations on contract furnace coke. Prices for standard grades, which are partly nominal, can be quoted as follows: Prompt furnace, $2.50; contract furnace, $2.50; prompt foundry, $3 @3.50; contract foundry, $3@3.25, per ton at ovens.

### BALTIMORE, MD.

Failing to get relief from the continued open-weather conditions, the local trade is now looking to the future expansion of business to force the large industries to enter the market. This is the only hope the trade has for any real profitable business. Many of the largest consumers, expecting severe weather in January and February, stocked up heavily, and because of the mild weather, the depletion of this supply was slow, and not a few of them have remained completely out of the market for the first two months of the year. There are now rumors that the concerns are about to the end of supplies, and will again be in the market shortly. There are also reports to the effect that there are inquiries for American coal on the part of English operators, who claim that they can find markets for the local product, among foreign consumers who prefer American, to English, coal.

While the date for the opening of the lakes has not yet been set, it is believed that it will be earlier this year, on account of the mild winter. The movement of coal from the West Virginia and Pennsylvania mining districts is increasing each year, and Western business always proves highly profitable to the trade. A few eastern contracts were closed during the week, but many consumers prefer to wait until the latter part of the month.

Practically the only fuel moving at this time, is on under contract. There is little or no spot business in sight. The week brought about no change in prices and the low grades are still being marketed around $1. Vessel rates continue easy, owing to prevailing good sailing weather. Train movements are all that could be desired, although there is still some complaint about a lack of cars. The local coke market remains firm, and there appears to be a fairly good demand for the product.

### BUFFALO, N. Y.

There has been plenty of winter lately, but it has come too late to help the coal trade. There has been some return of the demand and if March continues wintry, which is doubtful, the situation will be farly good. The amount of both anthracite or bituminous sold lately, has been much less as the consumer appears to have had a large amount bought that had not been delivered.

On account of the uncertainty of the demand, the jobbers have not known how to take the market. Sometimes it would look as if prices were going to smash and then there would be an increased firmness; at present the word is that contract prices will be better than they were last year. There are more dealers staying out of the contract market this year than usual and if they continue to hold aloof there will be an added solidity to everything on that account. There will also be a further effort to shut down if coal again drops down to cost, as some who did that last summer made a paying venture of it.

There is report of considerable bituminous on track at various points, as the railroads have not entirely caught up with bituminous, though there are no more reports of embargoes. Allegheny Valley operators now say there is no shortage of cars at the mines and everything is progressing smoothly. From that it must be taken as a certainty that the consumption of bituminous is heavy, for the output is probably larger now than it has been in a long time.

In spite of all this the bituminous trade is rather quiet and there is some cheap coal on the market. Prices are fairly steady and may go lower before long, but at present are quotable as follows: $2.80 for Pittsburgh select lump, $2.65 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Reynoldsville and Allegheny Valley 15 to 25c. lower, chiefly on account of the difference in freight rates. Coke still sags a little, the best Connellsville foundry being quoted at $5.15.

There is a small spurt in anthracite on account of some final heavy winter weather, but it is now too late for any great activity. Besides the local dealers as a rule had bought heavily and are taking advantage of the severe turn, but they will see their stocks run pretty low before they buy much more. It sometimes happens that March and even April are good coal-burning months, but they cannot be depended upon for it.

### COLUMBUS, OHIO

While the colder weather during the past week caused a small increase in domestic business, the coal trade in Ohio has been anything but active. It is between seasons and everyone is apparently waiting for the Lake trade to open. Orders from retailers are slightly larger and more numerous and this had the effect of bracing up what was a rapidly declining market. Prices have not reached lower levels than prevailed a week ago excepting in fine coal which is weak.

Steam business is fairly active although some decline is noted in the tonnage. The falling off is not sufficient, however, to demoralize the trade to any great extent and prices are about as strong as formerly for mine-run. Iron and steel concerns are not quiet as good purchasers as they have been during the past few months. Other lines of industry apparently buy as much as formerly. There is no movement among factories to stock up and many plants will purchase their fuel supply on the open market. Many of the contracts will be renewed at a slightly higher figure than prevailed the previous year.

Indications are bright for an active Lake demand. Reports from the Northwest indicate the consumption of most of the dock coal and as a result the movement will be large. It is expected that bottoms will be chartered earlier than usual. Plans are being laid for some development work in Ohio during the coming season. The greater part will be in the eastern Ohio district where there are thousands of acres of coal which has not been touched.

Operations in Ohio fields during the past week have been

fairly active. Operators from the Hocking Valley district report about 75 per cent. of normal and the same percentage is reported from the Pomeroy Bend district. In Eastern Ohio the output has been fairly large and the production is estimated at about 70 per cent. This section is busy renewing fuel contracts which expire about Apr. 1. In the strictly domestic sections, the output has been below 50 per cent. of the average.

Quotations in the Ohio fields are as follows:

| | Hocking | Pittsburgh | Pomeroy | Kanawha |
|---|---|---|---|---|
| Domestic lump | $1.50 | ..... | $1.50 | $1.45 |
| 2-inch | 1.35 | $1.20 | 1.35 | 1.30 |
| Nut | 1.30 | ..... | 1.30 | .... |
| Mine-run | 1.15 | 1.05 | 1.15 | 1.15 |
| Nut, pea and slack | 0.85 | ..... | 0.85 | 0.85 |
| Coarse slack | 0.75 | 0.85 | 0.75 | 0.75 |

### CLEVELAND, OHIO

Ohio carriers still hold an iron-clad embargo restricting the routing of coal via the Detroit & Toledo Shoreline Railroad, when destined to points on the Grand Trunk. Conditions at Toledo are acute and transportation people report an accumulation of 700 cars at that point. Many shippers have diverted their coal to the Ann Arbor and other Western connections to avoid the blockade.

Lake shippers have already started to load Lake coal at the mines and several large companies in the Youghiogheny district are forwarding Lake fuel to Cleveland via the Erie R.R. This coal will be loaded abroad vessels for forwarding via the Great Lakes at the opening of navigation. It has just been announced that the loading charge on fuel coal for coal carrying vessels will be reduced from 11c. to 8c. per ton. This change will be effective on all coal loaded on and after Apr. 15. Three hundred and fifty thousand tons of coal has been contracted for shipment via the Lakes at rates previously mentioned.

### HAMPTON ROADS, VA.

There has been comparatively slow dumping and heavy accumulations of coal during the past week, with prices remaining at the same low level, around $2.60 per gross ton f.o.b. There are approximately 5000 loaded cars at the three terminals or on nearby sidings and this, notwithstanding lighter loading at the mines. It is said that a curtailment for a week during the current month was agreed upon by the smokeless coal operators, but this has not been effective so far. What looks more promising, is the expected arrival of heavy vessel tonnage which, with the light loading, should aid materially in reducing the surplus stocks at the piers.

Movement of coal by the Norfolk & Western and Virginian Railways continues good, but the Chesapeake & Ohio is still badly congested and the tieup is especially bad at Richmond, where tidewater trains are being seriously delayed going through the yards.

It is said, on good authority, that the tidewater coal of the McKell Coal & Coke Co., some 500,000 tons annually, which has been handled by the Chesapeake & Ohio Coal & Coke Co. for a number of years, will, after Apr. 1, be sold by the Geo. E. Warren Co., of Boston. It has already been announced that the C. G. Blake Co. will handle the McKell inland coal.

### BIRMINGHAM, ALA.

The weather seems to have made a final effort to aid the retail dealers as winter of a severe nature has been prevailing during the current week. Although it is usually spring by this time, the cold wave in March has partially offset the unusually mild winter. Some additional protests are being made by retailers because of the 25c. increase in Cahaba domestic prices and many of them are slow in placing orders for their requirements.

All Alabama mines are working at a high production rate, and unless interfered with by car shortages or adverse business conditions the output for this year should be well above the 1912 figures, which were approximately 17 million short tons. The coke market is somewhat weaker, due possibly to the gradual decline which has been taking place in the local pig-iron market for the past several weeks.

### LOUISVILLE, KY.

In contracting, it is interesting to note that the Southern Ry., which, with the Louisville & Nashville, is taking a good deal of coal from company mines just now, recently made an arrangement with the Middlesboro operators by which it will take washed 4-in. round for steam purposes at $1 a ton, whereas the prices for straight run-of-mine, unwashed, have been 95c. a ton. Naturally, this has been a source of considerable satisfaction among these operators who have installed washing equipment, as it enables them to dispose of this grade at a profit, and get a higher average price for their coal than on mine-run basis. The railroad is said to have found that it gets better results from the smaller coal, owing to the quantity of impurities found in the mine-run.

Price for even the better grades of block and lump are uncertain, running from a maximum of $2 down to $1.60 or $1.75 as the lower levels at which sales are being made. The market on screenings is easier at present, the better grades of nut and slack selling around 75c., and 50 to 60c. for second grades from the Eastern field. Western Kentucky nut, pea and slack is being handled also at 60 to 75c., with domestic nut at about $1 and lump $1.25 to $1.35. A shortage in steam coal is looked for soon, however, on account of the condition of the domestic market.

### INDIANAPOLIS, IND.

The coal situation here presents no new features. The operators are concerning themselves chiefly in making new contracts over the next season and say they are asking what have been their standard prices.

Retailers are busy disposing of the coal they contracted for in the fall, with as little loss as possible. The daily newspapers have been carrying front-page articles, pointing out that consumers got no benefit from the mild winter; the price of coal has been as high this winter as it ever was, but the papers do not intimate that dealers have made any fortunes because such is the case. It is generally understood that the only thing that saved them from losses is that there was no price cutting in an effort to stimulate business.

A feature of the retail trade this season has been the larger sales of soft coals, especially Indiana's, caused by the difficulty in getting anthracite and coke in the earlier part of the winter and their unusually high price. Mine prices remain unchanged, with the mines running three and four days a week.

### DETROIT, MICH.

It is believed that many large steam contracts will be signed shortly and that the open-market buying this year will be fully as large if not larger than 1912. As to the domestic outlook, the cold weather of February, coupled with the fact that March has started in rather threatening, has started cleaning out the stock of high-priced coal, so that one may look for spring buying on the part of the retailers to a satisfactory extent. The operators in this branch predict also that higher prices will be obtained for this kind of fuel.

### CHICAGO

Notwithstanding the fact that there has been no material increase in the consumption of domestic coal, the wholesale demand has shown improvement during the week. This is attributed to the curtailment of shipments and to retail dealers having disposed of their storage supply. The steam market also showed some improvement as far as its technical position is concerned. The continued accumulation of egg and nut coal has resulted in its being moved into the domestic or steam trade, although the former met with a limited market and as a result was substituted for steam lump, mine-run, or even screenings. In consequence of the Chicago dealers curtailing their buying for the last two weeks, believing they had sufficient Western domestic coal to last through the season, many have been obliged to make unusually large inroads on their storage piles while fresh supplies were being withheld.

Prevailing prices in Chicago are:

| | Springfield | Franklin Co. | Clinton | W. Va. |
|---|---|---|---|---|
| Domestic lump | $2.07@2.22 | $2.45@2.55 | $2.27 | |
| Egg | | 2.45@2.55 | | $3.95 |
| Steam lump | 1.92@1.97 | | 2.17 | |
| Mine-run | 1.87@1.92 | 2.20@2.30 | 1.97 | 3 30 |
| Screenings | 1.57@1.62 | 1.90@1.95 | 1.67 | |

**Coke**—Connellsville and Wise County, $5.75@6; byproduct, egg, stove and nut, $5.50; gas house, $5.50.

### MINNEAPOLIS—ST. PAUL

About all the hard coal there is at the Head of the Lakes is a little egg size. Nut, stove and pea have been cleaned up for some time. Early this year wholesalers began ordering direct from Pennsylvania mines, but arrivals are slow. There is considerable pressure for the prepared sizes of hard coal; householders are ordering their second installments and find they cannot get what they want.

The situation on hard coal in the country is peculiar. Last fall many dealers ordered more coal than they actually needed and had to throw some on the ground, having their storage bins full. While in other towns, dealers did not get enough, and are now clamoring for shipments, and are even willing to pay premium prices.

Dock prices are holding firm at circular. Quotations on Illinois and smokeless coal are uncertain and buyers in most cases set the price. Some Smokeless from the east has been known to have sold on the basis of less than a dollar at the mines.

### ST. LOUIS, MO.

Continued spring weather and the action of the operators in producing and selling coal below cost, is keeping the market in the same condition that has prevailed for the past four or five weeks. There is absolutely no change and nothing to indicate that there will be any change.

As was to be expected, a few of the producers have reached their limit and have sought refuge under the bankruptcy laws, and it will not be surprising to have a few more follow suit. Several St. Louis offices have also been ordered to close up in order to curtail expenses.

Anthracite and coke, such as is coming in, are a drug on the market. A small volume of smokeless is moving in, but there is practically no demand. The circular on other coals is:

| | Carterville and Franklin Co. | Big Muddy | Mt. Olive | Standard |
|---|---|---|---|---|
| 2-in. lump | ..... | ..... | ..... | $0.85 @ 0.90 |
| 3-in. lump | ..... | ..... | $1.25 | ..... |
| 6-in. lump | $1.20 @ 1.25 | ..... | 1.35 | 1.10 |
| Lump and egg | 1.25 | $2.25 | ..... | ..... |
| No. 1 nut | 1.10 @ 1.15 | ..... | ..... | ..... |
| Screenings | 0.90 @ 0.95 | ..... | ..... | 0.65 |
| Mine-run | 1.05 @ 1.15 | ..... | ..... | 0.85 |
| No. 1 washed nut | 1.40 @ 1.50 | ..... | ..... | ..... |
| No. 2 washed nut | 1.35 @ 1.45 | ..... | ..... | ..... |
| No. 3 washed nut | 1.25 @ 1.30 | ..... | ..... | ..... |
| No. 4 washed nut | 1.15 @ 1.20 | ..... | ..... | ..... |
| No. 5 washed nut | 1.00 @ 1.05 | ..... | ..... | ..... |

### OGDEN, UTAH

All during the month of February the mines have been long on slack and nut coal. The slack can be handled by unloading at the mines, but none of the operators have had the courage to unload the nut as it would, no doubt, be a total loss; however, the operators are face to face with a large over-production of this grade of coal. A little latter in the spring and during the summer months there will be a fair demand for this, but at present it is a drag on the market. The operators are endeavoring to hold the market price on all grades, but there is a tendency to weaken in several localities, especially on slack and nut coal.

The Colorado operators have announced their spring quotations for April and May shipments to the Nebraska market, as follows, f.o.b. mines: Lump, $2.25; nut, $1.75. Wyoming and Utah quotations remain unchanged, except nut coal, which has been selling below circular, due to the surplus.

### PORTLAND, ORE.

It is expected that consideraole development work will be done this summer in the mines at Coos Bay, Ore., and in Washington; in the former district because of the fact that Coos Bay will have railroad facilities by the end of the summer, upon the completion of the Southern Pacific line from Eugene to Marshfield. It is said that there is little probability of much coal, if any, being imported here next summer and fall from Australia, on account of the high rates on vessels. Tonnage is fully as scarce now as last year and importations here were light.

## PRODUCTION AND TRANSPORTATION STATISTICS

### ANTHRACITE SHIPMENTS

The following is comparative statement of the anthracite shipments for February and the first two months, of the years 1912-13, in long tons:

| | February | | 2 Months | |
|---|---|---|---|---|
| | 1913 | 1912 | 1913 | 1912 |
| Phila. & Reading | 1,165,449 | 1,202,536 | 2,422,581 | 2,389,070 |
| Lehigh Valley | 1,062,129 | 1,083,925 | 2,237,280 | 2,104,372 |
| Cent. R.R. N. J. | 761,070 | 785,000 | 1,574,437 | 1,545,035 |
| Del. Lack. & West. | 763,571 | 782,699 | 1,685,670 | 1,574,397 |
| Del. & Hudson | 567,371 | 572,021 | 1,220,548 | 1,139,300 |
| Pennsylvania | 491,062 | 523,539 | 1,067,614 | 1,066,358 |
| Erie | 655,919 | 710,263 | 1,373,154 | 1,393,108 |
| Ont. & Western | 207,598 | 215,985 | 429,304 | 428,024 |
| Total | 5,674,169 | 5,875,968 | 12,010,588 | 11,639,664 |

### ANTHRACITE STOCKS AT TIDE

**Stocks at tidewater Mar. 1, were 484,270 tons, as compared with 375,566 tons on Feb. 1.**

### THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Mar. 1 as follows:

| | Surplus | Shortage | Surplus or Shortage |
|---|---|---|---|
| New England Lines | 33 | 110 | 77 |
| N. Y.; New Jersey, Del.; Maryland; Eastern Penn. | 1,196 | 1939 | 733 |
| Ohio; Indiana; Michigan; Western Pennsylvania | 4,240 | 134 | 4,106 |
| West Virginia, Virginia, North & South Carolina | 952 | 560 | 392 |
| Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida | 1,561 | 382 | 1,179 |
| Iowa, Illinois, Wis., Minn.; North & South Dakota | 3,163 | 193 | 2,970 |
| Montana, Wyoming, Nebraska | 623 | 82 | 541 |
| Kansas, Colorado, Missouri, Arkansas, Okahoma | 2,645 | 13 | 2,632 |
| Texas, Louisiana, New Mexico | 477 | 0 | 477 |
| Oregon, Idaho, California, Arizona | 3,149 | 30 | 3,119 |
| Totals | 18,039 | 3355 | 14,684 |
| Greatest surplus in 1912 (Apr. 25) | 94,692 | 2,144 | 92,5064 |
| Greatest shortage in 1912 (Oct. 10) | 6,491 | 14,897 | 8,48 |

## FOREIGN MARKETS

### GREAT BRITAIN

**Feb. 28**—Tonnage continues in heavy supply, and great activity prevails at the various docks. The inquiry for March delivery is brisk, and sellers are holding firm. Small coals particularly are scarce and dear.

Today's quotations are approximately as follows:

| | | | |
|---|---|---|---|
| Best Welsh steam | $4.56@4.62 | Best Monmouthshires | $4.14@4.20 |
| Best seconds | 4.38@4.50 | Seconds | 3.84@4.08 |
| Seconds | 4.26@4.38 | Best Cardiff smalls | 3.84@3.96 |
| Best dry coals | 4.38@4.44 | Seconds | 3.72@3.84 |

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days—less 2½%.

### FRENCH IMPORTS AND EXPORTS

The following is a comparative statement of the French imports and exports for 1911 and 1912:

| Imports | Coal | | Coke | | Briquettes | |
|---|---|---|---|---|---|---|
| *From*— | 1911 | 1912 | 1911 | 1912 | 1911 | 1912 |
| Great Britain | 9,099,345 | 9,022,411 | 211,909 | 122,797 | 482,655 | 426,124 |
| Belgium | 3,910,825 | 3,506,767 | 790,957 | 664,230 | 1,787,853 | 2,299,093 |
| Germany | 2,994,298 | 3,182,160 | 189,391 | 218,381 | 49,005 | 63,748 |
| Other countries | 227,319 | 255,430 | 86,982 | 117,336 | 49,005 | 63,748 |
| Totals | 16,231,787 | 15,966,768 | 1,189,239 | 1,122,744 | 2.319.513 | 2,788,964 |

| Exports | 1910 | 1911 | 1912 |
|---|---|---|---|
| Coal | 1,278,698 | 1,336,014 | 1,911,097 |
| Coke | 168,977 | 184,522 | 217,557 |
| Briquettes | 131,457 | 114,467 | 191,69 |

## COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending March 8:

| *Stocks* | Week's Range High | Week's Range Low | Week's Range Last | Year's Range High | Year's Range Low |
|---|---|---|---|---|---|
| American Coal Products | 87 | 87 | 87 | 87 | 87 |
| American Coal Products Pref | 101 | 101 | 101 | 109¼ | 109¼ |
| Colorado Fuel & Iron | 35¾ | 32¾ | 32¾ | 41¼ | 31 |
| Colorado Fuel & Iron Pref | .... | .... | 155 | 155 | 150 |
| Consolidation Coal of Maryland | 102¼ | 102¼ | 102¼ | 102¼ | 102¼ |
| Island Creek Coal Pref | 86 | 85 | 85 | .... | .... |
| Lehigh Valley Coal Sales | 240 | 204 | 204 | .... | .... |
| Pittsburgh Coal | 22 | 21 | 21 | 24⅜ | 19⅝ |
| Pittsburgh Coal Pref | 89¼ | 87 | 89¼ | 95 | 84 |
| Pond Creek | 23¾ | 22 | 23¾ | 28¼ | 22 |
| Reading | 159⅜ | 153⅞ | 154¼ | 168⅞ | 153⅜ |
| Reading 1st Pref | 90 | 90 | 90 | 91½ | 89¾ |
| Reading 2nd Pref | 90½ | 90 | 90 | 93 | 87⅞ |
| Virginia Iron, Coal & Coke | 51 | 51 | 51 | 54 | 44¼ |

| *Bonds* | Closing Bid | Closing Asked | Week's Range or Last Sale | | Year's Range | |
|---|---|---|---|---|---|---|
| Colo. F. & I. gen. s.f.g 5s | 98 | 99 | 99 | 99 | 98 | 99¼ |
| Colo. F. & I. gen. 6s | .... | .... | 107¼ | June '12 | .... | .... |
| Col. Ind. 1st & coll. 5s. gu | 81 | Sale | 81 | 82 | 81 | 85 |
| Cons. Ind. Coal Me. 1st 5s | .... | .... | 85 | June '11 | .... | .... |
| Cons. Coal 1st and ref. 5s | .... | 94 | 93 | Oct. '12 | .... | .... |
| Gr. Riv. Coal & C. 1st g 6s | 96 | 102½ | 102⅜ | Apr. '06 | .... | .... |
| K. & H. C. & C. 1st s f g 5s | .... | .... | 98 | Jan. '13 | 98 | 98 |
| Pocah. Con. Coll. 1st s f 5s | 87⅝ | 88 | 87¼ | Feb. '13 | 87¼ | 87¼ |
| St. L. Rky. Mt. & Pac. 1st 5s | 76 | 77½ | 76¼ | Feb. '13 | 76¼ | 80 |
| Tenn. Coal gen. 5s | 101 | 101½ | 100¼ | 100¼ | 100¼ | 103 |
| Birm. Div. 1st consol. 6s | 101 | 102¾ | 102¼ | Feb. '13 | 102¼ | 103 |
| Tenn. Div. 1st g 6s | 101 | 103¾ | 102 | Feb. '13 | 102 | 102 |
| Cah. C. M. Co. 1st g 6s | .... | .... | 110 | Jan. '09 | .... | .... |
| Utah Fuel 1st g 5s | .... | .... | .... | .... | .... | .... |
| Victor Fuel 1st s f 5s | .... | 79¾ | 79¾ | Feb. '13 | 79¾ | 79¾ |
| Va. I. Coal & Coke 1st g 5s | 96 | Sale | 96 | 97½ | 96 | 98 |

**No Important Dividends** were announced during the week.

# INDEX OF COAL LITERATURE

The following is a list of abbreviations used below:
A.E.G.-Ztg. = A.E.G.-Zeitung.
Am. Lab. Legis. Rev. = American Labor Legislation Revue.
Ann. Mines = Annales des Mines.
Ann. Mines Belgique = Annales des Mines de Belgique.
Austral. Min. Stand. = Australian Mining Standard.
Berg-Huttenmänn. Rdsch. = Berg- und Huttenmännische Rundschau.
Bull. Am. Inst. Min. Eng. = Bulletin American Institute of Mining Engineers.
Can. Eng. = Canadian Engineer.
Can. Min. Jl. = Canadian Mining Journal.
Chem. Eng. = Chemical Engineer.
Coll. Guard. = Colliery Guardian.
Comp.-Air Mag. = Compressed Air Magazine.
Compt. Rendus Acad. Sc. = Comptes Rendus de l'Académie des Sciences.
El. Eng. = Electrical Engineering.
El. Jl. = Electrical Journal.
El. Kraftbetr. = Electrische Kraftbetriebe und Bahnen.
Eng. Contract. = Engineering Contractor.
Eng. Min. Jl. = Engineering and Mining Journal.
Eng. News = Engineering News.
Fördertechnik = Die Fördertechnik.
Geol. Mag. = Geological Magazine.
Handel und Ind. = Handel und Industrie.
Int. Mar. Eng. = International Marine Engineering.
Inst. Min. Metal = Institute of Mining and Metallurgy.
Int. Volkswirt = Internationaler Volkswirt.
Iron Coal Trades Rev. = Iron and Coal Trades Review.
Jl. Soc. Chem. Ind. = Journal of the Society of Chemical Industry.
Jl. Ind. Engin. Chem. = Journal of Industrial and Engineering Chemistry.
Jl. Royal Soc. Arts = Journal of the Royal Society of Arts.
Jl. S. Afr. Inst. Eng. = Journal of the South African Institute of Engineers.
Kohle Erz = Kohle und Erz.
Lumière El. = Lumière Electrique.
Min. Eng. = Mining Engineer.
Mines Minerals = Mines and Minerals.
Min. Sc. Press = Mining and Scientific Press.
Min. World Eng. Rec. = Mining World and Engineering Record.
Mon. Ind. Gaz. = Moniteur de l'Industrie du Gaz et de l'Electricité.
Montan. Rdsch. = Montanistische Rundschau.
Oesterr. Z. Berg- Huttenwes. = Oesterreichische Zeitschrift für Berg und Hüttenwesen.
Portefeuille Econ. Machines = Portefeuille économique des machines.
Proc. Acad. Pol. Sc. N. Y. = Proceedings of Academy of Political Science, New York.
Proc. Am. Inst. El. Eng. = Proceedings of American Institute of Electrical Engineers.
Proc. S. Wales Inst. Eng. = Proceedings of South Wales Institute of Engineers.
Rev. Noire = Revue Noire.
Rev. Univ. Mines = Revue Universelle des Mines.
Saarbrucker Berg. Kal. = Saarbrucker Bergmanns Kalendar.
S. Afr. Min. Jl. = South African Mining Journal.
Soz.-Technik = Sozial-Technik.
Stahl Eisen = Stahl und Eisen.
Stein-Braunkohle = Stein und Braunkohle.
Tech. Rdsch. = Technische Rundschau.
Techn. Wirtsch. = Technik und Wirtschaft.
Tekn. Tidskrift = Teknisk Tidskrift.
Trans. Min. Inst. Scot. = Transactions of Mining Institute of Scotland.
Trans. Inst. Min. Eng. = Transactions of the Institute of Mining Engineers.
Trans. Manchester Geol. Min. Soc. = Transactions of the Manchester Geological and Mining Society.
Ung. Mont. Ind. = Ungarische Montanindustrie und Handelszeitung.
Z. Dampfkessel-Betr. = Zeitschrift für Dampfkessel und Maschinenbetrieb.
Z. El. Mach. = Zeitschrift für Elektrotechnik und Maschinenbau.

Note: We shall be glad to obtain for readers, where possible, copies of the papers referred to.

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The Antwerp Coal Basin, Belgium, to follow after the Development of Campine. de Lalande. (Le basin houiller d'Anvers apres celui de la Campine.) "Echo de Mines," Oct. 28, p. 1126.

Newer Prospect Borings, and Present Status of Knowledge as to the Extension of the West Galician Coal Field. Dr. Michael. (Die neuen Aufchslussbohrungen im Westgalizis-Berg- & Huetten, Ver. Zts.) 1912, p. 394-414. 50c.

The Development of Pit Coal Formation in the West Galician Weichsel District of Upper Silesia. Michael, 4. (Die Entwicklung der Steinkohlenformation im west galizischen Weichselgebiet des Oberschlesischen Steinkohlen bezirkes.) 4vo. 306 p. Berlin, Geol. Landesanstalt, 1912. $3.

Stratigraphy of the Northwest Bohemia Coal Field between Breux and Dux. A. Fleck. "Gluckauf," 1912. p. 1661-8. 75c.

The Mineral Fuels of Bulgaria. L. de Launay and S. Bontschew. (Die mineralischen Brennstoffe Bulgariens.) "Allgm. Oestr. Chemiker-Ztg. 1912, p. 145. 40c.

The Coal Fields of Oyon, Peru. Delgado. "Peru To-Day," 1912. Sept. p. 314.

### III—MINING TECHNOLOGY

Systematic Handling of Machinery. Fr. Helbig. (Systematische Maschinenbehandlung.) "Braunkohle." vol. 11, 1912. 17, p. 257-9.

Tests of Pick-Quick Electric Coal Cutters on the Petite Pleuse Coal Seam of 380 meters depth in the Monceau-Fontaine Colliery. Vogel & Losseau. (Essais de havage mechanique.) "Annales d. Mines Belgiq." 1912. vol. 17, 4. p. 1099.

Colliery Practice in Concreting. E. E. Seelye and Shurick, A. T. "Coal Age." vol. 2, 23, p. 822-5; 6 fig.

### IV—WORKING OF MINERALS

Protection Against Dangers of Mining. W. Heckmann. (Schutz gegen die Gefahren des Bergbaues.) "Bergbau," 1912, 46, p. 646-8, 1 fig. 50c.

High Grade Bituminous Coals—Their Mining and Preparation. A. Haenig. (Die Steinkohle, ihre Gewinnung und Verwertung.) Leipzig, 1912.

Machine Mining of Thin Coal Seam Using Face Conveyors; Ruhr. Dist. Germany. Bolesta-Malewski. (Abbau mit hohem Stoss unter Verwendung von Abbaufoerdereinrichtungen.) "Gluckauf." Oct. 26, p. 1749-58. Nov. 2. 75c.

Machine Mining in Oklahoma. J. S. Cameron. Coal Tr. Bull. 1912, p. 29.

Coal Mines in Arkansas. A. A. Steel. Vol. I. "Geol. Survey Report." 1912, 632 p.

### V—BORING, SHAFT SINKING AND TUNNELING

Concrete Mining Shafts. C. R. Fletcher. "Los Angeles Min. Rev." 1912. Nov. 1, p. 7.

Notes on Shotfiring by Electricity. F. H. Gunsolus. Coal Age, Vol. 2, 23, p. 787-8. (Prescribes remedies for the common failings in electric firing.)

### VI—TIMBERING, PACKING, ETC.

The Hydraulic Stowing of Goaves. Knox G. "Colliery Guard." vol. 104, 2711, p. 1195-6; 2712, p. 1240-1. (Special notes on the relation between subsidence and packing. The careful attention to the packing of the goaf is as important as the timbering.

Square Set Timbering. E. T. Rice. "Min. Eng. World." vol. 37, 24, p. 1079-82. 5 fig.

Mine Supports in Germany. "Min. Min." vol. 33. 5, p. 240-2, 16 fig. (Timber, steel and concrete rails, pipes and angle iron.)

Insect Damage to Mine Props and Its Prevention. T. E. Snyder. "Min. Eng. World," vol. 37, 23. p. 1043.

### VII—WINDING AND HAULAGE

Three-Phase Hoists at Bantjes Con. Mines, Transvaal. J. Askew. "Min. Eng. World." vol. 37. 22, p. 993-5, 2 fig. 2 tab.

New Arrangement in Mine Hoisting. H. K. English. "Coal Age," Vol. 2, 23, p. 791-2, 2 fig. (The electric hoist employing herringbone gears is placed on the ground, the operator is in the scale house and can watch the discharge of the car, but no signals are dispensed with.)

Cage Fence Gates. W. G. Peasegood. "Colliery Guard." Vol. 104, 2712, p. 1245. (The gates cannot be opened inward into the shaft.)

Skip Accidents on the East Rand. Suggestions for Safety Catch Inventors. S. African Min. Jl. 1912, p. 38. 50c.

Requirements for a Model Mine Track. McIntyre, J. B. "Coal Tr. Bull." Oct. 15, p. 35.

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Modern Practice in Mine Telephony. G. Brown. "Coal Age," vol. 2, 23, p. 789-91. 6 fig.

### IX—LIGHTING

Some Fundamental Principles of Safety Lamp Construction. Wm. Clifford. "Coal & Coke Op." 1912, p. 276.

### X—VENTILATION

C. F. & T. Co.'s Rockvale Mine, Fremont, Colo. J. B. Marks and G. Alley. "Coal Age," vol. 2, p. 744-6, 7 fig.

### XI—MINE GASES, TESTING

A Portable Electric Instrument for the Detection of Combustible Gases and Vapors in Air. L. J. Steele. "Jl. Inst. El. Eng." vol. 49, 214. p. 289-96. 2 fig. 3 ill. (The Philpp & Steel detector.)

### XII—COAL DUST

Prevention of Coal Dust Explosions. S. Dean. "Coal Age." vol. 2, 22, p. 756-8. 5 fig. 2 tabl.

The Production of Coal Dust in Mines. T. J. Matthews. "Min. Eng." p. 182. (Reviews the various means of producing dust underground.) 15c.

Dust Explosions. Young C. M. "Mines Min." vol. 33, 5, p. 258-60. (The influence of the composition and fineness of dust, and the presence of gas on the liability of ignition.

Wet Mines Not Necessarily Safe from Coal Dust Explosions. S. Dean. "Mines Min." vol. 33, 5, p. 245-8. 6 fig. 3 tab.

The French Experiments Made with Coal Dust at Lievin. M. Rybak. (Die franzoesischen Versuche mit Kohlenstaub in Lievin.) "Oesterr. Z. Berg-Huettenwes." 1912. 8. p. 99-103; 9. p. 113-7 50c.

Humidifying Mine Air to Avoid Explosion. "Black Diamond," 1912. p. 15.

U. S. Bureau of Mines Type of Air Humidifier. "Black Diamond." 1912, p. 19. "Eng. World." 1912, p. 852.

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Discussion of the Ignition of Coal Gas and Methane by Momentary Electric Arcs. W. M. Thornton. "Colliery Guard." vol. 104, 2712, p. 1242, 15c.

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### XV—RESCUE AND AMBULANCE

Mine Rescue Appliances. Dr. J. Cadman. "Colliery Guard." vol. 104, 2712, p. 1243-4. 2 fig. (Indicates a danger occurring in the use of an apparatus in which an injector is employed.) 15c.

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Improvements in Coal Preparation. A. J. Reef. "Coal Age," vol. 2, 24, p. 829-30, 4 fig. (Particular attention is given to defects in shaking screens and coal chutes of adjustable pitch, and the principal defects in other appliances.)

### XVIII—BRIQUETTES

The Briquetting of Pit Coal with Addition of Napthaline. Grahn. Steinkohlenbrikettierung mit Napthalinzusatz "Gluckauf," 1912. 38. p. 1536-7. 2 fig. 75c.

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The Coking of Coals at Low Temperatures, with a Preliminary Study of the Byproducts. S. W. Parr and H. L. Olin. Univ. of Illinois, Eng. Experiment Station Bull. No. 60.

Automatic Indicating Devices at Coke Tar Plants, with Special Reference to Gas Metering. A. Thau. (Selbsttaetige Betriebsueberwachung auf Teer-Kokerien mit besonderer Beruecksichtigung der Gasabsaugung.) "Gluckauf," 1912, p. 1706-19, p. 1858-64. 75c.

Byproduct Coke Ovens. "Metall. Chem. Eng." vol. 10, 12, p. 806-11. 2 fig.

Coking Practice in the South Wales District. Greaves, R. H. G. "Foundry Tr. Jl." vol. 14. 130. p. 618-23. 3 fig. 3 tab.

The Coking of Coal at Low Temperatures. "Power." vol. 36. 19. p. 697. (Considers the possibility of modifying the composition of raw coal in order that a different type of fuel may be produced in coking.)

The Coking of Coal at Low Temperatures. S. W. Parr, and H. L. Olin. "Colliery Guard." vol. 104. 2708. p. 1039-42. 1 fig. 3 tab. 15c.

The Manufacture of Coke. F. E. Lucas. "Am. Inst. Min. Eng." Bull. 71. p. 1315-26. (Deals exclusively with the by-product oven and its economy of working.)

The Manufacture of Coke. W. H. Blauvelt. "Am. Inst. Min. Eng." Bull. 71. p. 1299-1314. 1 fig. (The qualities of the by-product oven and some of its advantages over the beehive oven.)

Progress in Byproduct Coke Manufacture. F. E. Lucas and others. "Iron Age." vol. 90. 20. p. 1161-5. 5 fig.

Significance of the Counter Current. J. Verner. "Coal Age." vol. 2. 20. p. 677-9. 2 fig. (The flame of an explosion feeds on the rear of the dust column, so there must be fresh air behind the dust! The air is supplied by the return draft. The coke dust on the leeward side of projections is deposited also by the counter current.)

Electric Smelting in Norway. J. L. Vogt and others. "Min. Jl." vol. 99. 4031. p. 1145-7. (The employment of coke as a reduction material in electric iron smelting is considered to make a poorer and more sulphur-containig pig iron.) 25c.

### XX—FUEL TESTING

Shortcomings of the B. T. U. System. G. D. C. Coal & Coke Op." 1912, p. 225.

Testing Texas Lump Lignite. Earnest, D. C. "Min. Min." Nov. p. 180.

Determining Coal Values, Chemical and Calorific. Bailey, E. G. "Min. Meth." Nov. p. 191.

Decomposition of Coal in Storage and Upon Exposure. (Ueber die Zersetzung von aufgestapelter Kohle.) "Kali Erz & Kohle," Oct. 25, p. 1072.

New Calorimetric Bomb, System Fery. (Nouvelle bombe calorimetrique "Ind. Nat." 1912. vol. 118. 2 sem. 1. p. 30-6. 2 fig. (Thermo-electric bomb.)

Determination of Heating Value of Solid Fuels by Calculation from the Proximate Analysis. H. H. Clark. "Progress Age." vol. 30. 22. p. 881. 3 tab. (Formula applied to anthracite, bituminous and lignite coal and coke.)

Spontaneous Combustion of Coal. S. F. Walker. "Gas World." vol. 57. 1480. p. 725-8. 5 fig. (Some methods of prevention are discussed.) 30c.

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Selling Energy instead of Slack. "Coal Age," vol. 2, 23, p. 781-4, 9 fig. 1 tab. (Electric energy generated from slack and sold in nearby towns.)

Boiler Practice and Fuel Economy. Dales. J. H., "Eng. Rev." vol. 26. 5. p. 166-8. (The estimated preventable loss of fuel is 10%, which is valued at £8,000,000 per annum.)

How and Why Coal Smoke Is Injurious. B. C. Benner. "Metall. Chem. Eng." vol. 10. 11. p. 735-7. 3 fig. 3 tab. (Some specific instances from the town of Pittsburgh.)

Laws in Force in Europe against the Emission of Black Smoke. J. B. C. Kershaw. "Metall. Chem. Eng." vol. 10. 11. p. 756-9. (American laws differ greatly in various States, European laws have greater uniformity.)

Smoke Abatement as Related to Steam Railroads. W. A. Hoffman. "Boiler Maker." vol. 12, 11. p. 325-7. 5 fig.

### XXII—ELECTRICITY

Electricity Applied to Coal Mining. J. T. Jennings. Coal Age," vol. 2, 23, p. 779-80.

Electrical Equipment of the Shelton Iron Steel & Coal Co.'s Works, Stoke-on-Trent. "Colliery Guard." vol. 104, 2711, p. 1187, 6 fig.

Application of Electric Power for Coal Mining. S. R. Stone. "Min. Eng. World," vol. 37, 24, p. 1085-8, 3 fig.

Emergency Treatments of Mine Electrical Troubles. E. Clemens. "Coal Age," vol. 2, 23, p. 793-5, 10 fig.

Central Stations Service in Mining Operations. E. T. Spence. "El. World." vol. 60. 5. p. 260-1. (Interest of the central station in the use of electricity, in coal mines within reach of its circuits; electric cutting of coal, haulage, draining and pumping, hoisting of coal, ventilating, lighting.)

A German Electrical Colliery Installation. J. B. Van Brussel. "Coal Age." vol. 2. 19. p. 635-7. 4 fig. 2 tab. (A typical plant of six unusually complete electrical plants which total 20,000 hp.; the important units are all duplicated.)

Mine No. 9 of the Penn. Coal and Coke Corp. R. D. Mainwaring. "Coal Age." vol. 2. 18. p. 600-3. 6 fig. (The electrical equipment is exceptionally complete and extensive, also a large amount of water is handled.)

Electrical Regulations in Belgian Coal Mines. "Coll. Guard." vol. 104. 2706. p. 939-40. 15c.

Underground Mine Switches. D. W. Jessup. "Eng. Min. Jl." vol. 94. 22. p. 1031-4. 17 fig.

The Wireless Motor in Mining. S. McMahon. "Coal Age." vol. 2. 20. p. 671-2.

Alternating Current Motors for Mines and Mills. S. R. Stone. "Min. Eng. World." vol. 37. 19. p. 839-43. 7 fig.

### XXIII—SURFACE TRANSPORTATION

Mechanical Handling of Coal for British Locomotives. C. J. B. Cooke. "Colliery Guard." vol. 104, 2712, p. 1239-40. 1 fig. 15c.

An Electric Elevated Tramroad Installation. "Coal Age," vol. 2, 24, p. 831-2, 3 fig. (It employs no third rail nor overhead trolley, no cross-ties nor sleepers are used; the cars dump automatically in all weathers.)

Lake Docks May Determine Success at Panama. "Black Diamond," 1912, p. 18. (Coal handling methods at lake docks.)

Mechanical Handling of Coal for British Locomotives. J. C. B. Cooke. "Inst. Civ. Eng." No. 2. 27. Nov. 1912. p. 1-5.

The Adair Face Conveyor. "Coll. Guard." vol. 104. 2708. p. 1035-6. 11 fig. (A coal conveyor which is designed to take as little space as possible in a verticle direction when discharging.) 15c.

Gantry Coal Handling Crane. A. D. Williams. "Power." vol. 36. 20. p. 703-4.

The World's First Coal Port. M. Meredith. "Cassier's Mag." vol. 42. 5. p. 379-88. 9 fig. (The Bute Docks, Cardiff, of the Cardiff Railway Co.) 40c.

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Compulsory Reporting by Physicians of Industrial Diseases. L. W. Hotch. "Am. Labor Legisl. Rev." vol. 2, p. 263-72.

Miners' Baths. W. B. Wilson. "Coal Age." vol. 2. 18. p. 619-20. 10. 656-8. 4 fig. (Notes upon provision made in different mines and the building constructions for from 650 to 1000 men.)

Miners' Baths. H. F. Bulman. "Coal Age." vol. 2. 18. p. 619-20. 6 fig. (Method of running the bath and some mechanical appliances for suspending clothes, the locked hoists being under owners' control.)

Town Planning on the South Yorkshire Coalfield. P. H. Boulnois. "Colliery Guard," vol. 104. 2709. p. 1092-3. 15c.